



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

MH
6
L17

JP



Read about 100

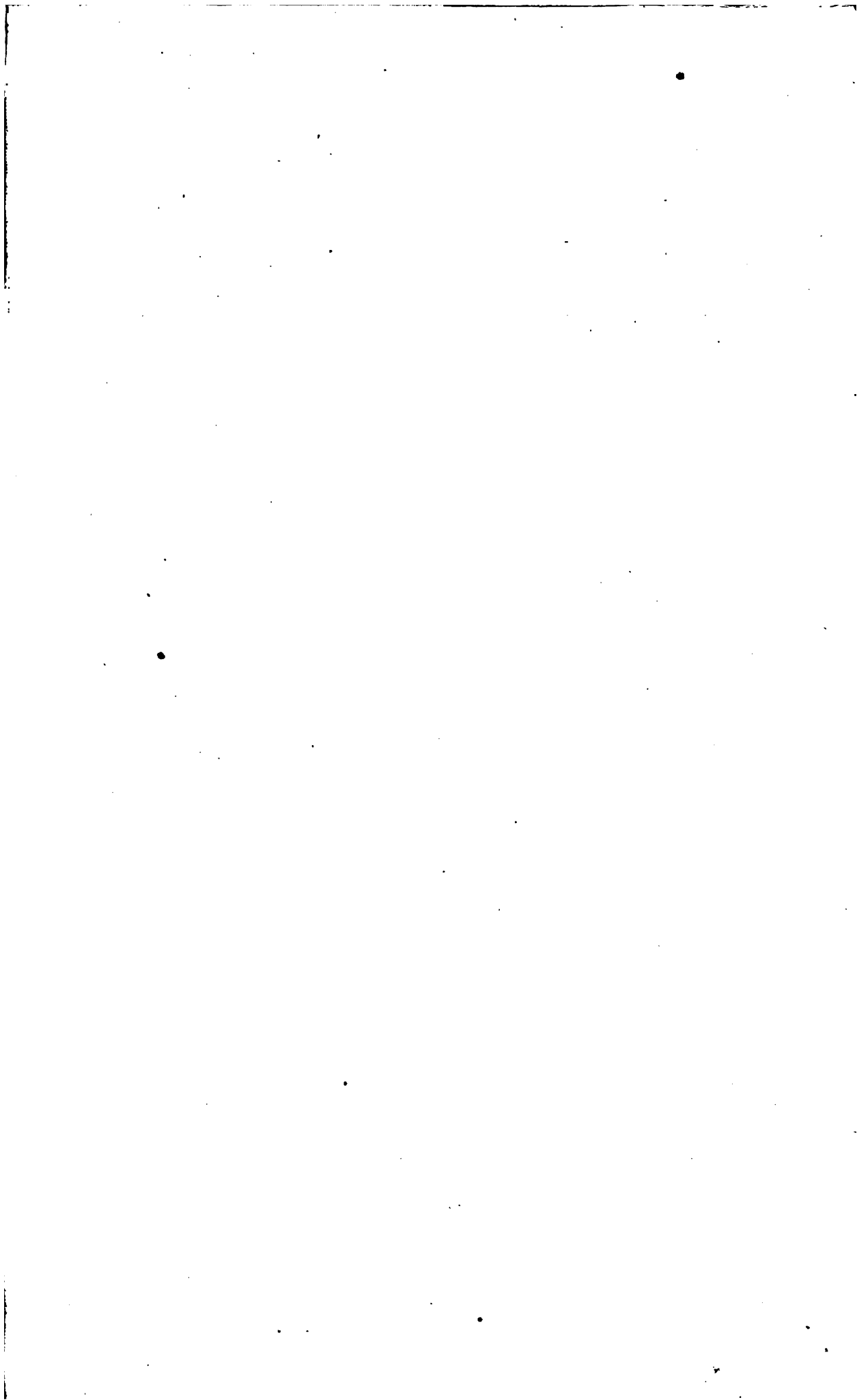
Plant
#

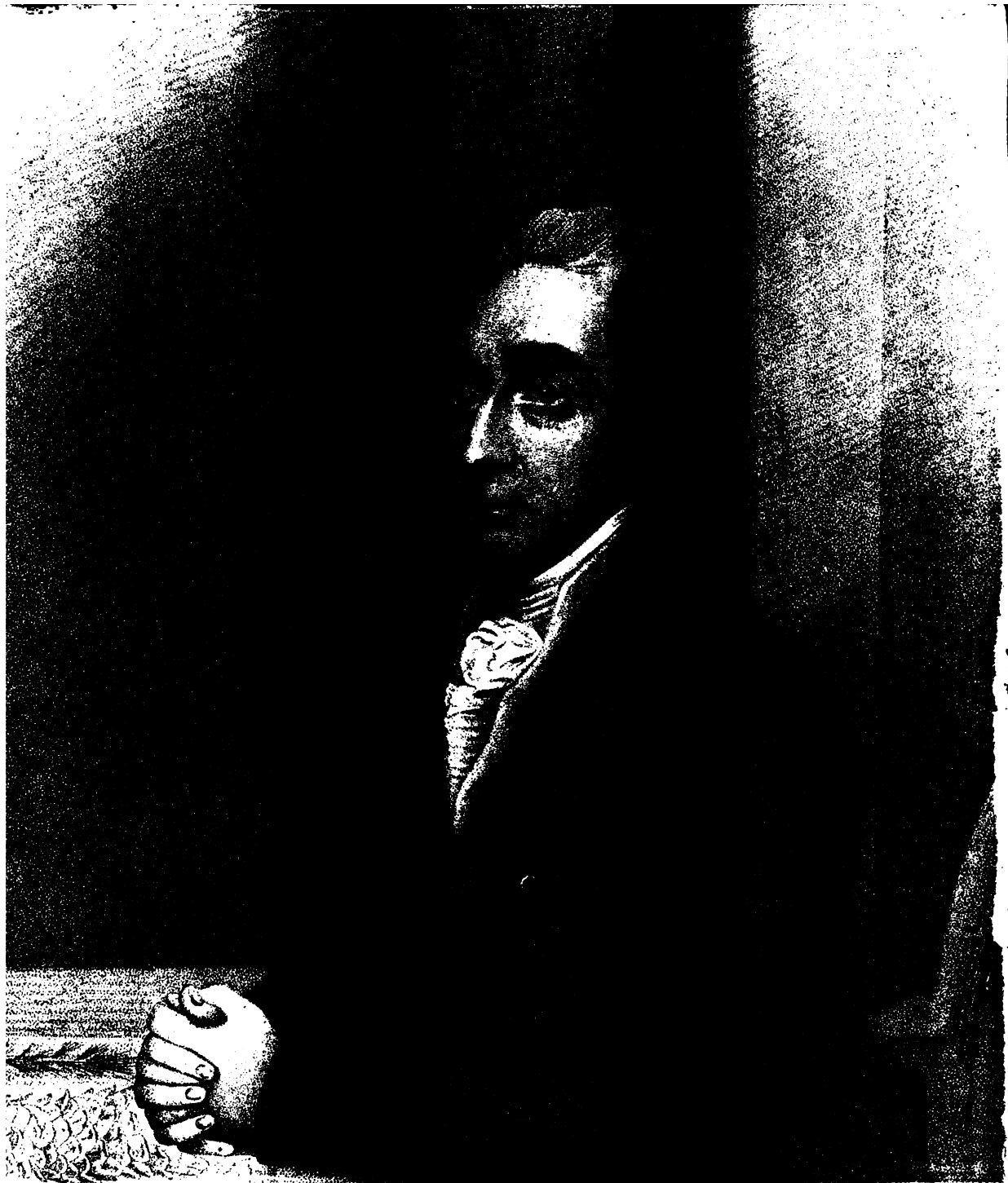
CONTENTS

| | | | | |
|-----|--------------------|----|--------------|--------------|
| 1. | PINUS SYLVESTRIS | 29 | PINUS | EXCELSA |
| 2. | PINUS PUMILIO | 30 | PINUS | LAMBERTII |
| 3. | PINUS BANKSIANA | 31 | PINUS | ABIES |
| 4. | PINUS LARICIO | 32 | PINUS | ALBA |
| 5. | PINUS PALLASIANA | 34 | PINUS | RUBRA |
| 6. | PINUS MARITIMA | 35 | PINUS | ORIENTAL |
| 7. | PINUS HALEPENSIS | 36 | PINUS | PICEA |
| 8. | PINUS MASSONIANA | 37 | PINUS | BALSAMEA |
| 9. | PINUS PINASTER | 38 | PINUS | FRASERI |
| 10. | PINUS PINEA | 39 | PINUS | RELIGIOSA |
| 11. | PINUS INOPS | 40 | PINUS | WEBBIANA |
| 12. | PINUS RESINOSA | 41 | PINUS | CANADENS |
| 13. | PINUS VARIABILIS | 42 | PINUS | DUMOSA |
| 14. | PINUS TAEDA | 43 | PINUS | TAXIFOLIA |
| 15. | PINUS RIGIDA | 44 | PINUS | LARIX |
| 16. | PINUS PUNGENS | 45 | PINUS | PENDULA |
| 17. | PINUS SEROTINA | 46 | PINUS | MICROCARPA |
| 18. | PINUS PATULA | 47 | PINUS | CEDRUS |
| 19. | PINUS TECOTE | 48 | PINUS | DEODARA |
| 20. | PINUS LEIOPHYLLA | 49 | PUNNINGHAMIA | SINENSIS |
| 21. | PINUS MONTEZUMAE | 50 | DAMMARA | ORIENTALIS |
| 22. | PINUS OCCIDENTALIS | 51 | DAMMARA | AUSTRALI |
| 23. | PINUS PALUSTRIS | 52 | ARAUCARIA | IMBRICATA |
| 24. | PINUS LONGIFOLIA | 53 | ARAUCARIA | BRASILIANI |
| 25. | PINUS CANARIENSIS | 54 | ARAUCARIA | EXCELSA |
| 26. | PINUS SINENSIS | 55 | TAXODIUM | DISTICHUM |
| 27. | PINUS CEMBRA | | TAXODIUM | SEMPERVIRENS |
| 28. | PINUS STROBUS | 57 | CUPRESSUS | LUSITANICA |

| Plant # | | | (mm) → |
|---------|------------------------|--|--------|
| 58 | CUPRESSUS PENDULA | | |
| 59 | EUPR. TOULOSA | | |
| 60 | EUPR. NDOTKATENSIS | | |
| 61 | THUJA PLICATA | | |
| 62 | THUJA CILICENSIS | | |
| 63 | THUJA PENNSILIS | | |
| 64 | THUJA PENDULA | | |
| 65 | THUSA DOLOBRATA | | |
| 66 | JUNIPERUS SOUMATA | | |
| 67 | JUNIPERUS UVERNA | | |
| 68 | DACRYDIUM CUPRESSINUM | | |
| 69 | DACRYDIUM TAXIFOLIUM | | |
| 70 | DACRYDIUM DISTICHUM | | |
| 71 | PODOCARPUS SALIGNA | | |
| 72 | PODOCARPUS OLEIFOLIA | | |
| 73 | PODOCARPUS GLOMERATA | | |
| 74 | PODOCARPUS NEREI FOLIA | | |
| 75 | PODOCARPUS MACROPHYLLA | | |
| 76 | PODOCARPUS PUNGENS | | |

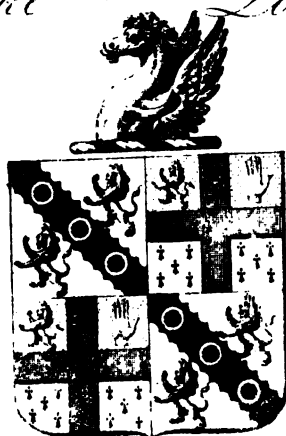






Aylmer Bourke Lambert Esq.^{re}

Vice President of the



Linnean Society &c. &c. &c.

X

A

DESCRIPTION OF THE GENUS

PINUS,

WITH

DIRECTIONS RELATIVE TO THE CULTIVATION,

AND

REMARKS ON THE USES OF THE SEVERAL SPECIES:

ALSO

DESCRIPTIONS OF MANY OTHER NEW SPECIES

OF THE

FAMILY OF CONIFERÆ.

Illustrated with Figures.

I.

BY AYLMER BOURKE LAMBERT, ESQ.

F.R.S. A.S. G.S. H.S. M.R.A.S. AND H.M.R.I.A.

VICE-PRESIDENT OF THE LINNEAN SOCIETY; MEMBER OF THE IMPERIAL ACADEMY
NATURÆ-CURIOSORUM, OF THE ROYAL ACADEMY OF SCIENCES OF MADRID,
AND OF THE ROYAL BOTANICAL SOCIETY OF RATISBON.

LONDON:

MESSRS. WEDDELL, PROSPECT ROW, WALWORTH.

MDCCCXXXII.

K

MH
6
417

LONDON

IBOTSON AND PALMER, PRINTERS, SAVOY STREET, STRAND.

TO

T H E K I N G .

SIRE,

YOUR MAJESTY having graciously permitted me to lay this work at Your Majesty's feet, I am anxious that it should be accompanied by the expression of my profound respect and veneration.

As Your Majesty has been pleased to evince a desire to encourage the cultivation of Botany, the lovers of that science humbly trust that, in common with all other useful pursuits, it will always enjoy Your Royal Patronage, and flourish under Your auspicious Reign.

Fervently hoping that Your Majesty will long live, to extend to the sciences Your fostering hand, and to rule over one of the most enlightened nations on earth,—dear to the hearts of Your people, and in the enjoyment of every blessing,

I most humbly subscribe myself,

SIRE,

Your Majesty's

Most dutiful and devoted Subject and Servant,

A. B. LAMBERT.

P R E F A C E.

THE difficulty and obscurity of the GENUS PINUS have long been remarked and regretted by Botanists ; and, though so many of its species possess peculiar recommendations to the attention of horticulturists, instructions have been wanting for their better cultivation and management. It is in consequence of the growth of this tribe having been little attended to, and of authors forming their descriptions chiefly from dried and mutilated specimens, that so much confusion has prevailed. Even Linnæus himself seems to have been very partially acquainted with the changes produced by diversity of soil, and the various stages of growth ; and the *Hortus Kewensis*, in which the species are certainly much better distinguished than in any other work, does not enumerate all that are now known, nor does it in every instance discriminate their characters correctly. The more frequent intercourse with foreign parts, and consequently the greater facilities which scientific travellers find in visiting the remoter regions of the earth, have tended infinitely to enlarge our views in every branch of natural history, not only by the vast increase of new species, but by the accession of a rich fund of interesting facts and observations.

Conceiving therefore a new arrangement of the Genus to be particularly desirable, I have devoted my attention to it for some years, and have not failed to apply to every source of information connected with the subject, having visited every plantation within many miles of the metropolis, and consulted every author of repute, with a view not only to ascertain the most accurate specific distinctions, but also to collect every fact relative to the culture and uses of every individual species. One of my objects in

writing this work was to endeavour to promote the growth of deal timber in this country, which might be effected much more than at present, and would certainly prove of national importance. Neither would I overlook the ornamental part, or the improvement of the numerous plantations around the Noblemen and Gentlemen's seats in this kingdom, which at present are composed too much of one species of *Pinus*, and that not the most beautiful, the Scotch Fir. I attribute this to the different species not having been properly pointed out, a defect which is here endeavoured to be remedied.

I cannot help lamenting that more has not been done in London towards the promotion of natural science, in describing and publishing accounts of the numerous and interesting public museums of natural history here collected; more abundantly perhaps than in any other part of Europe. But collections are piled upon collections and altogether neglected, while new productions are sought with avidity in distant regions; and I cannot but agree with Cuvier in his excellent Eloge on the celebrated Bruguières that one cause of this neglect, and perhaps the chief, is the facility of procuring pleasures of all kinds in a gay and rich metropolis, added to the charms of the fascinating society in which we live; all these hold out temptations which encroach terribly on literary leisure, and only leave room for a few sacrifices to celebrity; which, it must be confessed, are not advanced by insulated descriptions and minute discussions.

The gardens at *Pain's Hill*, deserve to be noticed as affording a great variety of Pines, and for the excellence of their growth. A considerable sum of money was formerly made by the gardener every year by selling the cones for seed. *Kew Gardens* likewise furnish many species in high perfection. Among the most striking are *Pinus palustris*, probably now the largest in England; *Pinus Cembra*, annually producing fruit; *Pinus Pumilio*, *Pinus Halepensis*, and *Pinus resinosa*. There are several Pines remaining at *Whitton*, once the seat of Archibald Duke of Argyle, so often referred to in the *Hortus Kewensis*. The first *Pinus Cembra* ever planted in our Island is now growing in these gardens in perfect maturity. Not less worthy of attention are two fine trees of *Pinus pendula* and *Pinus microcarpa*, bearing great quantities of cones annually.

By far the finest trees of the Cedar of Lebanon in this country,

are those at Petersham Lodge, near Richmond; they were most probably planted by the Earl of Rochester, who possessed the place about 1688.

Sion, the seat of the Duke of Northumberland, furnishes many fine trees of this Genus, particularly of *Pinus resinosa* and *Pinus Tæda*. *Croome*, the seat of the Earl of Coventry, affords almost every species that can be procured. Here are large trees of *Pinus palustris*, *Pinus Pumilio*, *Pinus Banksiana*, &c. *White Knights*, the charming residence of the Duke of Marlborough, contains a greater number of species of the natural order of *Coniferae*, perhaps than any other in Europe. The park and garden are embellished with every species of hardy trees than can at present be procured: the number of species, and indeed of individuals of each, is greater than that of any other collection I have had an opportunity of seeing. To form an idea of the scale on which these gardens are laid out, it need only be mentioned that one *Arboretum* occupied seven acres, and has recently been considerably enlarged. The superior skill in cultivation of the worthy owner, and its excellent soil and situation, have rendered the collection at *White Knights* one of the most interesting which this country has produced; and it is only excelled by the collection at *Dropmore*, the seat of Lord Grenville, which is by far the richest in this genus, as the noble proprietor has spared no pains or expense in rendering it as complete as possible.

The perfection to which Pines arrive on a strong soil, may be seen in the very extensive plantations of the Duke of Wellington, at *Strathfieldsay*, Hampshire; which, in about forty-two years, have grown to a much greater size than any others I have ever seen.

Perhaps it will be necessary here to notice several Pines which appear to me to merit being considered as distinct species; but of which I have not yet been able to obtain sufficient materials to enable me to give descriptions of them. Having lately seen drawings, done by Japanese artists, of the *Pinus Abies* and *Larix*, noticed by Thunberg in the *Flora Japonica*, I am now fully satisfied of their being perfectly distinct from the European species, with which Thunberg has confounded them, as I had at first suspected. For the former I would suggest the name of *Pinus Thunbergii*; and for the latter, noticed by Kämpfer, that of *Pinus Kämpferi*. Thunberg's *Pinus strobus* is evidently the same with *Pinus*

excelsa. As to his *Pinus Cembra* and *syloestris*, I can say nothing; but I have little doubt that they will prove distinct species.

It is proper, in this place, to mention how much I am indebted to the works of Evelyn, Du Hamel,* Hunter,† and Wangenheim.‡ The last in particular, which has not hitherto appeared in our own language, was found to contain so much valuable matter, that it has been quoted very largely. I ought also here to express my obligations to the late Sir James Edward Smith and Jonas Dryander, Esq.; also to Dr. William George Maton, and William Townshend Aiton, Esq., from whose kind attention and important communications I have derived essential assistance throughout the whole progress of the early part of this work. I have also to acknowledge having received much valuable information from Dr. Wallich; but my thanks are especially due to Mr. David Don, for the pains he has taken in drawing up the characters and descriptions of the new species, as well as for the very accurate manner in which the whole has been executed.

The perusal of the valuable memoir on the genera of the *Coniferae*, by that learned botanist, the late Mons. Richard, and recently published by his son, has led Mr. Don to re-examine the *Dammara australis* and *orientalis*, as well as *Taxodium*, and thereby to correct some important errors into which he had fallen in his descriptions of them. Mr. Don has also derived great assistance from it in forming the systematic table of the genera and species.

* *Traité des Arbres et Arbustes*, 2 tomes.

† Edition of Evelyn's *Sylva*, 4to. 1755, and 4to. 1774.

‡ *Beytrag zur tutschen holzgesechten forst wissenschaft*. Folio, Gotting.



Pinus sylvestris

* *Foliis pluribus ex eâdem basi vaginali.*

TAB. 1.

1. PINUS SYLVESTRIS.

SCOTCH FIR.

PINUS SYLVESTRIS, foliis geminis rigidis, strobilis junioribus pedunculatis recurvis dependentibus, antherarum cristâ exiguâ.

P. *sylvestris*, foliis geminis, rigidis; strobilis ovato-conicis, longitudine foliorum, subgeminis, basi rotundatis. *Soland. MSS.*

P. *sylvestris*. *Linn. Sp. Pl.* 1418. *Syst.* 860. *ed. Reich.* v. 4. 172. *Hort. Cliff.* 450. n. 1. *Fl. Suec.* n. 874. *Lapp.* n. 346. *Mat. Med.* n. 470. *Woodv. Med. Bot.* 570. t. 207. *Sm. Fl. Brit.* 1031. *Huds. Angl.* 423. *With. Arr. ed.* 3. 615. *Lightf. Scot.* 587. *Pallas Ross.* v. 1. 5. t. 2. f. I, i. *Scop. Carn.* n. 1196. *Pollich. Pal.* n. 913. *Gunn. Norv.* n. 337. *Villars Dauph.* v. 3. 804. *Trew in Nov. Act. Nat. Cur.* 3. *App.* 452. t. 15. f. 1. 3. t. 16. f. n. 25. *Mill. Illust.* t. 82. *Du Roi Harb. ed. Pott.* v. 2. 16. *Evel. Sylv. ed. Hunt.* t. 262. *Blackw.* t. 190.

P. foliis binis, convexo-concavis, conis masculis solitariis alaribus. *Hall. Helvet.* n. 1660.

P. *rubra*. *Mill. Dict.* n. 3.

P. *sylvestris communis*. *Ait. Kew.* v. 3. 366.

P. n. 29. *Gmel. Sib.* v. 1. 178.

Habitat in Europæ borealis sylvis glareosis.

Floret Maio.

DESCRIPTIO.

Arbor excelsa, rectiuscula, ramis obliquis. *Cortex* squamoso-deciduus. *Folia* e vaginis tubulosis, membranaceis, corrugatis, laceris, per ramulos spiralitèr dispositis, geminatim prodeuntia, biuncialia, erecto-patentia, linearia, obtusa cum mucronulo cartilagineo, serrulata; suprâ canaliculata; subtùs convexa, ecarinata; atro-viridia, glabra, sempervirentia. *Amenta* terminalia, pedunculata, basi bracteata: *mascula* spicata, numerosa, erecta, ovata, obtusa, flava, nuda; staminibus monadelphis, numerosis; antheris pedicellatis, cuneato-oblongis, marginatis, bilocularibus, apice cristâ membranaceâ parvâ, sub-erosâ, auctis: *feminea*

sæpiùs terna, erecta, ovato-subrotunda, viridia, post impregnationem recurvato-pendula ac fuscescentia; squamis imbricatis, dilitatis, acuminatis; bracteis interioribus elongato-acuminatis, ciliato-dentatis. *Strobilus* secundo anno maturus, pendulus, sesquiuncialis, ovato-oblongus, tessellatus, squamis angulatis, pyramidatis, retusis, tuberculois, inermibus. *Seminum* ala verticalis, falcato-lanceolata, elongata, acuta.

THIS well known tree, though tall, seldom grows straight, and the branches shoot rather obliquely. The bark is rough and cracked. The leaves are short, pungent, concave on the upper surface, convex on the under, and of a pale green colour. The male flowers are whitish. The pollen is sometimes in spring carried away by the wind in such quantities, as to alarm the ignorant with the notion of its raining brimstone. The strobili, or cones, are small, nearly conical, and pointed; they grow to the number of two, three, or four together round the branches. While they are young, they are generally pendent, and of a purplish colour. The squamæ, or scales of the cones, project in the middle, and form four distinct areas, or compartments. The seeds are small, somewhat like those of *P. Abies*.

As *P. sylvestris* grows spontaneously in Scotland, Denmark, Norway, and other countries in the north of Europe, it would seem that a cold climate alone suited it, but experience proves that when it is properly reared and planted, no temperature, scarcely, impedes its growth to a considerable size.

The seed should be procured in the following manner. The cones, which must be gathered in the winter, should be preserved until the month of June, when they must be occasionally brought forth, and exposed to the utmost heat of the sun; this will cause the scales to open, so that the seeds may easily be shaken out. They should be laid on a large carpet, or oil cloth, which will save the seeds that drop when the cones are turned, for as often as the scales on one side of them are opened, it is proper that the other should be turned to the sun to receive the same effect. These seeds will be fit to be sown in the spring following; the middle of April or May is the best time. Warm dry weather is requisite for the sowing, and a fine light mould. Beds should be made in the seminary three or four feet wide, and the seed sown in these at a little more than a quarter of an inch in depth. The young Firs will appear in about six weeks, with the husks of the seeds on their heads, and at this period they must be carefully watched, for if the sparrows or other birds once take to them, they will destroy every plant as fast as it comes up, so fond are these creatures of the husks. In order, therefore, to secure the young crops, it will be proper to cover them with some good nets, and to draw over the latter strings with feathers tied across, that before they have any temptation, the birds may be frightened away, and the plants, at their first appearance,

remain unnoticed by them. As soon as all the plants are come up, and have parted with their husks, the nets and strings with feathers may be taken off, for the seedlings will then be out of danger.

The following summer they will need no other care than being kept free from weeds. In the latter end of March, or the beginning of April, the second year, they should be taken out of those beds and put into others, at the distance of three or four inches from each other. When they are first removed, being one year old from the seed, they will be found to have no shoot, but are slender plants with small weak buds; and by the spring following, few of them will have made a shoot, though the bud will be considerably stronger. In the spring of the third year the young Firs ought to be removed a second time, viz. into the nursery, where they should be planted about one foot asunder, and at the distance of two feet in the rows. The ensuing summer they will have grown to the height of one foot, or more. In the spring of the fourth year, if the ground designed for the plantation be ready, and there be no rabbits or hares near the spot, they may be transplanted for the last time. If any of the animals just mentioned have the means of getting to them, it will be most advisable to defer the final removal to another year. Plantations are often wholly destroyed by hares, the winter after they are made, unless they have acquired some strength, and reached the height of three or four feet. But here it ought to be remarked, that the larger trees may be grown, the greater will be the difficulty of removing them; and when they are of a tolerable height, many will necessarily be lost after they have been transplanted.

It is advisable to allow Firs in all open situations, the distance of four feet or more, and to place them irregularly in the final place of growth. They will always flourish best when planted in turf, or where the earth has not been disturbed. (From not attending to this circumstance, it often happens that the trees become unhealthy and defective. Fruit trees, in some parts of the west of England, particularly Wiltshire, are apt to suffer in the same way, on account of having a border before them; and I have known a large garden planted three times in consequence of this circumstance, which, notwithstanding, may occur only in chalky soils, as I have had no experience of other situations.) In about five or six years, the branches will have met, and begun to interfere with each other: pruning will now be necessary, but it is not to be done without great caution, and the lower branches only are to be taken away. The operation ought to be performed in September, at which time there will be no danger of the wounds bleeding too much. It should be repeated every other year, leaving all the upper branches entire; the lower should be cut close to the stem. As these trees never put forth new shoots where they are pruned, nor from below that part, so they suffer more from amputation than others. At the expiration of twelve or fourteen years, no more pruning will be necessary, for such branches as do not enjoy a free access of air, will die; but if the

young trees have made good progress, it may be proper to thin them occasionally. The gardener ought to begin with those which are in the middle of the plantation, in order that they may enjoy the shelter of those which are on the outside, for a time, and then acquire strength before the whole number are exposed to the admission of a current of cold air. When the plantations are thinned, the roots should not be torn up, lest the trees which are left standing be injured; as these roots will not shoot again, no disadvantage can arise from suffering them to decay in the earth. As the upright growth of these Firs renders their wood the more valuable, they should be left pretty close together, in order to draw each other up. Some trees will shoot to the height of twenty feet with perfect straightness. If they be left eight feet asunder each way, there will be quite sufficient room for their growth.

It is from *P. sylvestris* that the *red* Deal is obtained, as we are informed by Mr. Coxe. The *white* is from *P. Abies*, which, he says, is the most demanded, because no country produces it in such quantities as Christiana and its vicinity. One tree yields three pieces of timber eleven or twelve feet in length, and is usually sawed into three planks. Before it arrives at its greatest perfection, however, a tree must generally attain seventy or eighty years growth. (See *Northern Tour*, vol. v. p. 37. *oct. edit.*) I am indebted to Mr. Davis, of Wiltshire, for much information on the subject of Deal, as well as on the produce of other species of Pines, which the reader will find in another part of this work. It is surprising that this species is not more cultivated on waste grounds in several parts of Great Britain, as the few planted on Bagshot and Hounslow Heaths, &c. succeed so well. I have observed it thrives least on chalky land; but even there it does as well, if not better, than any other species, provided the ground be not disturbed about its roots. The *larva* of an insect, (which I suppose to be one of the under-mentioned *Phalænæ*, although I have not yet had an opportunity of watching its transformation to determine the species*), injures the young plantations of this tree. The *larva* introduces itself into the pith, or *medulla* of the young shoots, on which it feeds, and which are soon destroyed by it. I have seen several young trees in the plantations of Henry William Portman, Esq. at Bryanston, Dorset, bearing marks of the injury alluded to: and the same circumstance I observed in the year 1801, in the large trees of this species in the plantation of William Beckford, Esq. at Fonthill, Wilts. The first volume of the *Museum Rusticum* contains a paper on this subject.

The following insects are observed to take up their abode on *P. sylvestris*, viz. *Phalæna sylvatica*. *P. catenata*. *P. seticornis*. *P. testacea*. *P. resinorum*. *Tenthredo pennacea*. *T. erythrocephala*. *Aphis Pini*. *Curculio Pini*. *C. septentrionalis*. *Dermestes præmorsus*. *D. pini*.

* Since writing the above, I find it to be *Dermestes piniperda*, Linn. *Ips piniperda*. Marsham, Entom. Brit. 57.



Pinus sylvestris

Widdell del.

London: Published by Messrs. Widdell, May 1st 1830

perda.* (*Ips piniperda* of Marsham.) *Cimex pinetorum*, and *Acarus ruber*.

It has been supposed, from the authority of Duhamel, that *P. sylvestris* grows in St. Domingo, but the Pine sent from that island is the *P. occidentalis* of Swartz, hereafter to be mentioned.

There is a specimen in the Banksian collection, marked "*Pinus Tatarica*, from Pain's Hill," which is distinguished from *P. sylvestris*,† in Dr. Solander's description, solely by the colour of the branches.

EXPLANATION OF TAB. 1.

The Plate exhibits a branch of *Pinus sylvestris*, which, like the figures and the detail of the fructification in all the following Plates, where the contrary is not expressed, are of the natural size.

- a. Male Catkin with its bractæ.
- b. c. Anthera and Crest of the Anthera, magnified.
- d. Female Catkin with its bractæ.
- e. A separate Scale, magnified.
- f. g. A ripe Cone. The same expanded by drought.
- h. Seed with its wing.

* Linnæus says of this species, "*Habitat in Europæ ramulis inferioribus pini, quos perforat, exsiccat, unde naturæ hortulanus in hac arbore.*" But its depredations are not confined to the lower branches: for in the extensive plantations of Mr. Beckford, at Fonthill, so much of the medulla of the *young shoots* has been eaten through by this insect, that many fine trees have been almost destroyed: and in the year 1801, when I observed this fact, apprehensions were entertained of several others suffering the like fate.

† The late Mr. Geo. Don, in a valuable paper on the varieties of the Scotch Fir, inserted in the Caledonian Hort. Mem. vol. i. p. 121, has been led to distinguish at least *four* varieties of the *Pinus sylvestris*, "one of which is of so fixed and marked a character, that it may probably be entitled to rank as a Species," distinct from the common tree, whose branches form a pyramidal head; and he proposes the trivial name of *horizontalis*, from the horizontal and drooping direction of its boughs. In this tree the leaves are broader than in the common variety, and serrulated, not marginated, and they are distinguishable at a distance by their lighter and beautiful glaucous colour. The bark of the trunk is not so rugged, and its cones are generally thicker, not so much pointed, and smoother than in the common Scotch Fir. Mr. Don also remarks, that it seems to be a more hardy plant, being easily reconciled to very various soils and situations; and conjectures that the fine woods which formerly abounded in Scotland, and the trees of which arrived at a large size, were of this variety or species; whilst he has observed that the greater part of the fir woods of the present day, and which are so much complained of, are of the common variety. In this way, Mr. Don would account for the supposed decline of the Scotch Fir in this country, for two reasons: first, because the former variety still retains all the good qualities ever ascribed to the Scotch Fir; and secondly, because, as the common variety produces its cones much more freely than the other, the seed-gatherers, who were only to be paid by the quantity, and not by the quality, would 'seize upon the former and neglect the latter. "The evident remedy for this defect in our plantations of Scotch Fir," concludes Mr. Don, "is therefore the cultivating exclusively the second and well-marked variety." Of the other two varieties, one is more common than the "*horizontalis*," the leaves, which are "of a truly light glaucous hue, approaching to a silvery tint, are serrulated,—a character which at once distinguishes it from the common variety, with which it agrees, in having a pyramidal head: this is also a good tree. Whilst the fourth variety, the leaves of which are somewhat curled or rather twisted, and much shorter," is scarce, Mr. Don not having seen more than three or four specimens.

TAB. 2.

2. PINUS PUMILIO.

THE MUGHO, OR MOUNTAIN PINE.

KRUMHOLZ. *Germ.*

PINUS PUMILIO, foliis geminis abbreviatis strictis strobilis ovatis obtusis minimis: junioribus sessilibus erectis.

- P. sylvestris montana* γ. *Ait. Kew. v. 3. 366.*
P. sylvestris humilis γ. *Neal. Cat. Hort. Blackb. 50.*
P. Mughus. *Du Roi Harbk. ed. Pott. v. 2. 41. Scop. Carn. n. 1195. Willden. Berlin. Baumz. 206.*
P. conis erectis. *Tournef. Inst. 586. Scheuchz. It. 460. Duhamel. Arb. v. 2. 126. n. 13.*
P. humilis, julo purpurascens. *Tournef. Inst. 586. Duhamel. Arb. v. 2. 126. n. 12.*
P. sudeticus seu carpaticus. *Ungarisch. Mag. 3 ter band. 38.*
Pinaster conis erectis. *Bauh. Pin. 492.*
P. Pumilio ex monte Arbâ Bavariz. *Camer. Hort. 127.*
P. Pumilio montanus. *Park. 1537. f. 8.*
P. Pumilio. *Clus. Pan. 15. Hænke Beob. 68. Hall. Helvet. n. 1660. γ.*
P. quartus austriacus. *Clus. Hist. v. 1. 32.*

Habitat in montosis Europæ australis.
Floret Junio.

DESCRIPTIO.

Minima in hoc genere. Præcedente longè humilior, vix septempedalis, sarmentis repentibus, ramulisque radicanlibus. Folia minora. Anthararum crista ampliata, biloba. Amenta fæminea nunquàm arcuato-recurva. Strobili ovati, obtusi, duplò quàm in præcedente minores.

THE specimen from which the figure was taken, was obligingly presented to me by John Blackburne, Esq. of Orford. The tree was planted by that gentleman's father, who possessed one of the finest collections of exotic plants in the kingdom, an account of which may be seen in Neal's Catalogue, and which is still kept up with great care and attention.

The Mugho Pine grows on the tops of the highest mountains, where



Pinus Pumilio.

scarcely any other tree is to be found, and it often covers with its thick and almost impenetrable branches a very extensive tract. Hænke has given the most complete description of it that I can find, and this is copied by our countryman Townson, who observed this species to be very exuberant on the mountains of the more northern parts of Hungary. The roots generally run, it seems, in an oblique or subhorizontal direction; they are long, thick, and hard, clothed above ground with a brownish bark, shooting often to a considerable extent quite bare of earth. The branches proceed either immediately from the root, or from a low radicating trunk, scattered, long, and pliable. They are commonly about four or five feet in height, but in some instances will exceed that of a man by one foot or more. On the upper part the branches are extremely thick, and covered with a strong ash-coloured bark, which is rendered very rough and uneven by the tubercles of the fallen leaves. The smallest branches are very short as well as thick, bent in at the base, and naked to a certain height, but at the upper part they are profusely leaved and folded within each other. The leaves spring from a dry, jagged, brownish sheath, and are of a woody texture, being firm and tough. They are slightly incurvated, often twisted, and obtuse. The under surface is flat, or but slightly concave, the upper convex, the margins are minutely serrated. They are smooth, shining, faintly striated, and of a green colour, approaching to yellow at the points. Their length is from one to one inch and a half, and the breadth scarcely one fourth part of a line. The *male flowers* are terminal, and grow several in a bunch. The *female* lateral, sessile, invariably erect, sometimes single, sometimes collected into a bunch to the number of ten or twelve, ovate or subglobose, and resemble very much those of *P. Larix*, both in size and shape; in colour they are brownish, or inclined to purple. The *squamæ*, or scales, are imbricated, in their more advanced state, often open and without the *apex* that appears in the earlier ones. There is a gibbosity outwards; and on the inner side, somewhat of a concavity is observable. This tree, though of humble growth, when planted on a lawn assumes a handsome and ornamental appearance. It was supposed to be a variety of *P. sylvestris*, but I had made a distinct species of it before I saw Hænke's description. What distinguishes it particularly from the latter is, the young cones which grow erect and sessile until they are above one year old, when they become horizontal; and they can scarcely be said to be pendent, even when they are full grown; whereas, those of *P. sylvestris* have long peduncles, and become pendent soon after they are impregnated with the pollen. The cones of *P. Pumilio* are of a looser texture, and but slightly attached to the tree. When the branches of this tree are broken, a transparent resin of a very fragrant smell exudes, and this is collected and sold in the form of a native Balsam. A sort of empyreumatic æthereal oil is obtained

by distillation from the burned branches, and sold in Hungary, under the name of Krumholz oil.

There is a specimen in the Herbarium of Sir Joseph Banks, marked in Miller's own hand-waiting, *Pinus Tatarica*, which without doubt belongs to *Pinus Pumilio*.

Pinus Mughus, Jacq. Ic. rar. tab. 193, does not belong to *P. Pumilio*, but appears to be only a variety of *P. sylvestris* from a specimen I examined in the Herbarium at Oxford.

EXPLANATION OF TAB. 2.

- a. Male Catkin, magnified.
- b. Anthera, ditto.
- c. Female Catkin, ditto.
- d. Ripe Cone.
- e. Young Cones in their natural situation.
- f. Ripe Cone expanded by drought.
- g. A separate Scale.
- h. Seed.



Pinus Banksiana

TAB. 3.

3. PINUS BANKSIANA.

LABRADOR PINE.

PINUS BANKSIANA, foliis geminis divaricatis obliquis, strobilis recurvis
tortis, antherarum cristâ dilatâtâ.

P. sylvestris divaricata δ . *Ait. Kew. v. 3. 366.*

P. canadensis bifolia, foliis curtis et falcatis, conis mediis incurvis. *Du-
hamel. Arb. v. 2. 126. n. 10. ?*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor ramosissima, patula, ramis longissimis. *Folia* uncialia, falcata.
Amenta mascula cylindracea: antheris sessilibus, cristâ reniformi,
emarginatâ, crenatâ, utrinque prominulâ. *Strobili* bini vel terni,
sessiles, magnitudine *P. sylvestris* sed graciliores, pallidiores, fla-
vescentes, acuminati, et insignitèr incurvato-torti.

THE specimen represented in the plate was taken from a remarkably fine tree growing at Pain's Hill,* Surrey. The branches of this tree bore more fruit than any species I have seen. The cones were not more than five or six inches distant from one another in scarcely any part of the tree, and they were growing two or three together. Many of the young shoots were covered with resin, the odour of which was inconceivably fragrant. It flowered, I was informed, earlier in the spring than any other Pine. It is most partial to a sandy soil. The *branches* shoot very thickly almost the whole of its height, and consequently render the timber too knotty to be made into good masts, though it is very pliable, and contains a great quantity of resin. The *leaves* do not differ much from those of *P. sylvestris*, except that they are curved and divaricated, the pairs touching each other at their extremities so as to form a sort of ring. The *cones*

* This beautiful spot was the seat of the late Hon. Charles Hamilton. It is now in the occupation of — Moffat, Esq. Linnaeus, the son, visited those gardens in company with Sir Joseph Banks, and expressed himself highly gratified in viewing their productions.

are curved in a similar manner, having the appearance of horns springing from the branches; they are of nearly the same thickness as those of the Scotch Fir, but rather longer. At present *P. Banksiana* is very rare in England; I know only three of any size, one of which is at Pain's Hill, and this is certainly the finest; one at Kew; and the other at Croome, the seat of the Earl of Coventry. It is surprising that this species should ever have been supposed to be a variety of *P. sylvestris*, the one being an American and the other an European tree. I am not acquainted with any author who has noticed it, except Mr. Aiton in his *Hortus Kewensis*. Whether Duhamel's species above quoted be the same, may be questioned; but as he mentions the cones to be remarkably contorted, I have given his synonym with a doubt. By whom this species was first introduced into England I have not yet learned. Mr. Forsyth, of Kensington Gardens, received a tree of it some years ago from a person who had been sent into the interior parts of America by the late Dr. Fothergill; this probably was the first that found its way into England.

As I am entirely obliged to Sir Joseph Banks for the first knowledge of this species, I have given it his name.

EXPLANATION OF TAB. 3.

- a. Leaves with their sheath.
- b. Male Catkin.
- c. Anthera magnified.
- d. Female Catkin
- e. Ripe Cone.
- f. Scale of the Cone.
- g. The same seen on its inside.
- h. Seeds
- i. A Seed without its wing.

"*Pinus Banksiana* occupies dry, sandy soils, to the exclusion of all others. It is a handsome tree, with long, spreading, flexible branches, generally furnished with whorled curved cones of many years' growth. It attains the height of forty feet and upwards in favourable situations, but the diameter of its trunk is greater, in proportion to its height, than in the other pines of the country. In its native situation, it exudes much less resin than the *Pinus Alba*. The Canada porcupine feeds on its bark; and its wood, from its lightness, and the straightness and toughness of its fibres, is much prized for canoe timbers. The Canadian voyagers term it Eypres, the Crees Ooskartawuc-ahtic. It occurred on our route as far to the northward as lat. 64°, but it is said to attain higher latitudes on the sandy banks of Mackenzie's River."—*Dr. Richardson's Appendix, No. 7, p. 752, in Captain Franklin's Narrative of a Journey to the Shores of the Polar Seas, in the Years 1819—1822.*



Pinus Laricio.

TAB. 4.

4. PINUS LARICIO.

CORSICAN PINE.

PINUS LARICIO, foliis geminis prælongis patentibus, vaginis subintegræ, strobilis ovatis rectis subsolitariis: squamis depressis obsolete 4-angulis. *Don, in Neill's Horticul. Tour, p. 552.*

Pinus Laricio. *Poir. in Lam. Encycl. V. p. 339. Lam. et Decand. Flor. Fran. III. p. 274. Duham. Arb. ed. alter. p. 239, t. 71 et 67, f. 2.*

Pinus sylvestris e maritima. *Ait. Kew. III. p. 366.*

Habitat in insulæ Corsicæ montibus summis; in Phrygiæ Ida Monte. (*P. B. Webb.*)

DESCRIPTIO.

Arbor altit. 56 ped., pulcherrima, pyramidata, ad apicem attenuata, cortice badio integro et epidermide deciduâ squamosâ tecta. *Rami* 8—10 in verticillis digesti, breviores et densiores quàm in *Pino sylvestri*. *Folia* gemina, numerosa, prælonga (6—7-uncialia), lenta, patentia, acicularia, semicylindracea, subtùs lucida, suprâ canaliculata atque levitèr striata, margine scabrè serrulata, apice mucrone corneo instructa, colore jucundè viridia. *Vaginæ* foliorum unciales, subintegræ, argenteo-fuscæ, nitidæ. *Amenta mascula* in apice ramulorum terminalia, conferta, cylindracea, obtusa, unum v. sesquipollicem longa, patula, incurva, basi squamis pluribus scariosis spadiceis bracteata. *Antheræ* cuneato-oblongæ, angulatæ, biloculares, subtùs rimâ duplici longitudinali hiantes, apice cristâ subrotundâ convexâ membranaceâ margine eroso-repandâ auctæ. *Strobili* sessiles, ovati, horizontalitèr porrecti, subsolitarii: *squamis* induratis, ligneis, cinereo-fuscis, apice cuneatis depressis obsolete 4-angulis, spinâ umbonatâ minutâ durissimâ armatis. *Don in loc. cit.* (addenda descriptioni amenta mascula.)

The preceding description, together with the following account, was taken by Mr. Don from two fine trees which he saw in the Jardin du Roi at Paris, in 1821, and published in the appendix to Mr. Neill's interesting

Horticultural Tour through France and the Netherlands. Mr. Don's account is as follows:—

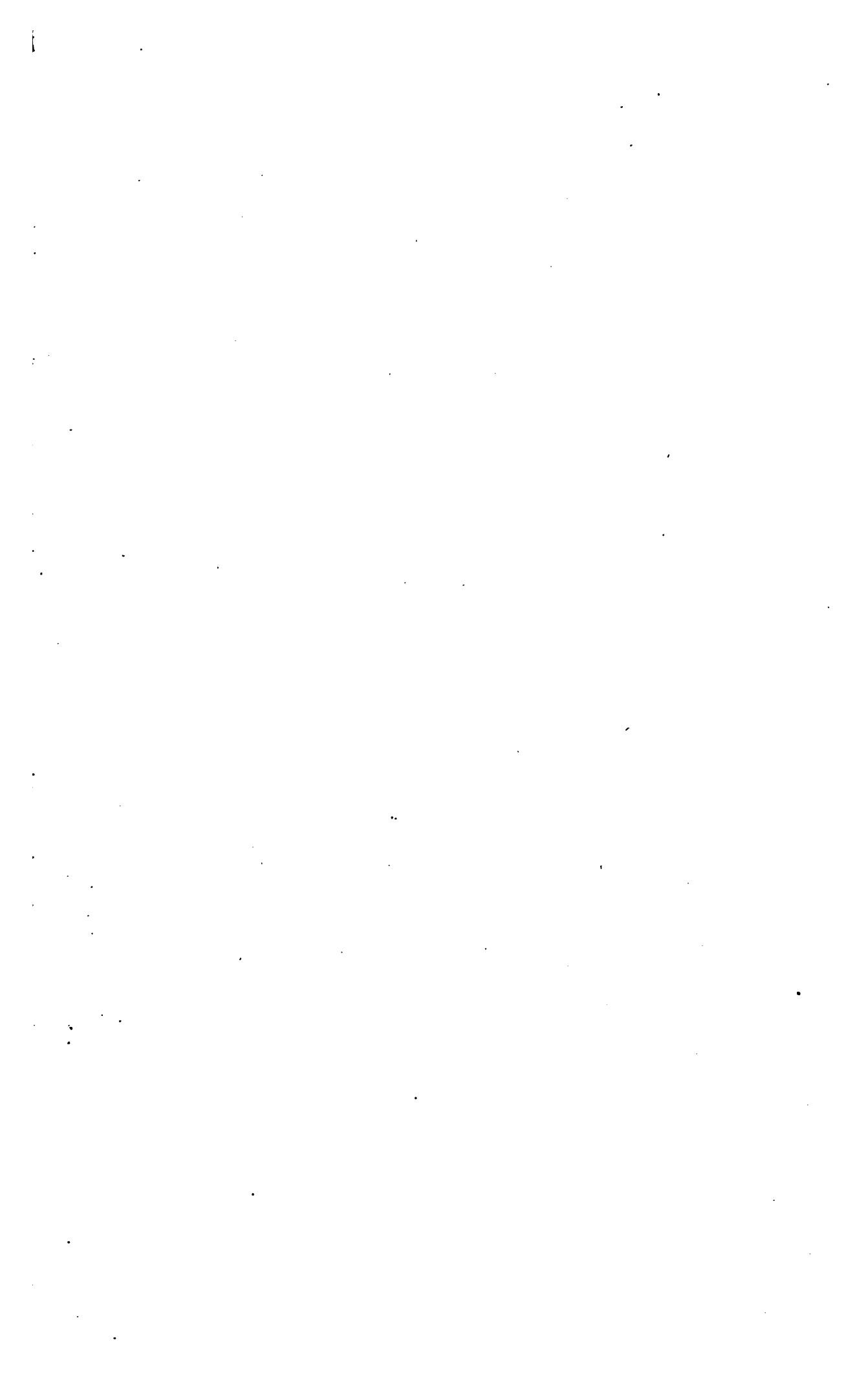
“ This tree is totally distinct from all the varieties of *Pinus sylvestris*; with which, however, it in some respects agrees. The tree in the Arboretum on the buttes is thirty feet high, and three feet in circumference; and immediately beside it is growing *P. sylvestris*, or, as Professor Thouin calls it, *P. Scotica*. The difference at first sight is very striking. *P. Laricio* is a much handsomer and finer tree, and is of a more pyramidal habit. Its branches are shorter and more regularly verticillate. Its leaves are a third longer, and of a lively green, with their sheaths nearly entire. Its cones are shorter, ovate, and quite straight, with depressed scales; and its bark is finer and much more entire. The enlightened Professor of Agriculture informed us, that it is equally hardy with *P. sylvestris*, and that its wood is much more weighty and resinous, and consequently more compact, stronger, and more flexible, than that of *P. sylvestris*. It grows wild on the summits of the highest mountains in Corsica. It seems to bear cones very freely, which ripen nearly about the same time as those of *P. sylvestris*. The tree from which the above description was taken, stands near the centre of the General Arrangement, was planted in 1784, and is now fifty-six feet high.”

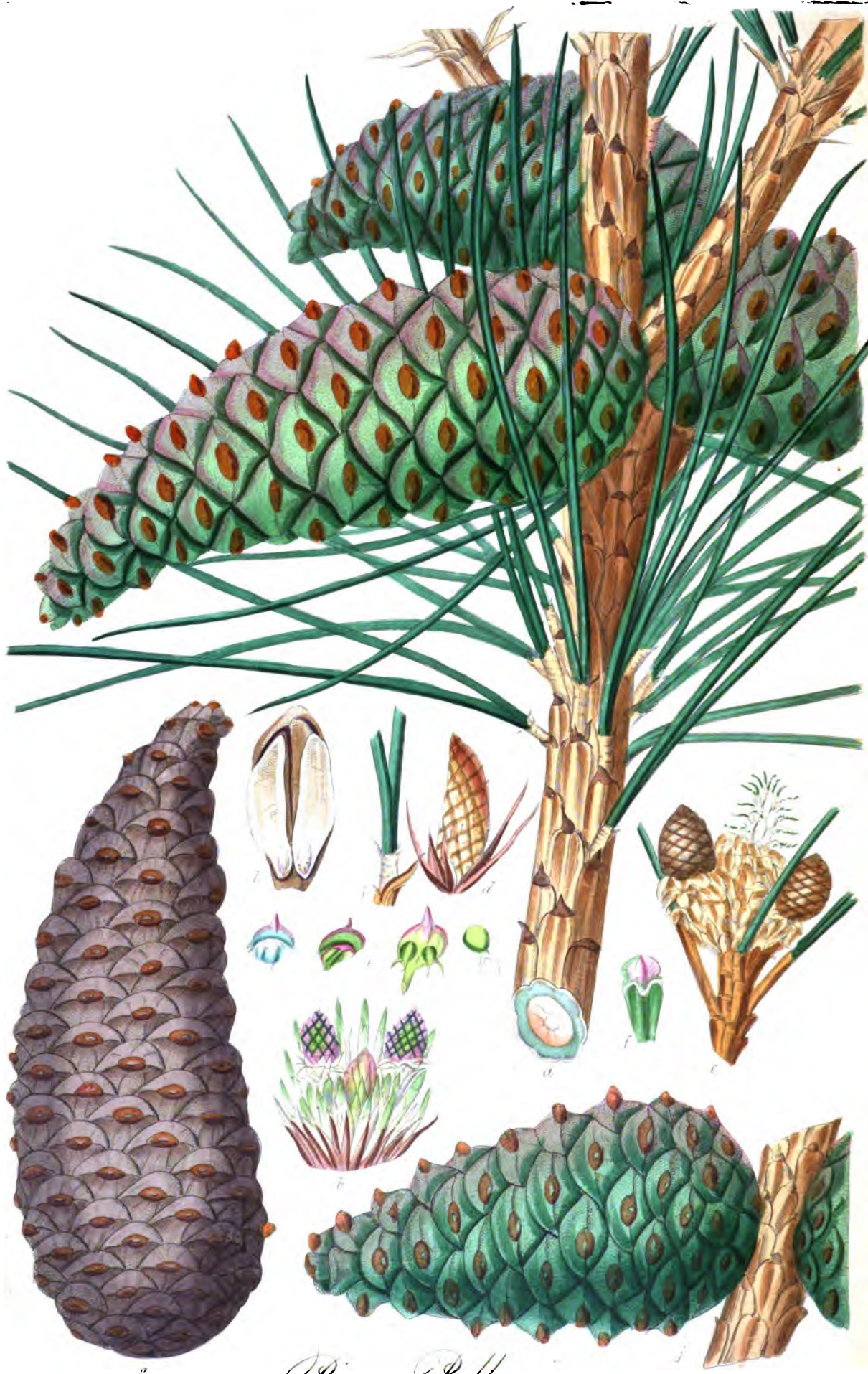
“ I observed,” says Mr. Hawkins, “ on Cyllene, Taygetus, and the mountains of Thasos, a sort of Fir, which, although called Πευκος by the inhabitants, and much resembling the Πευκος of the lower regions, differed from it in these particulars: the foliage was much darker, and the growth of the tree much more regular and straight. The very elevated region on which it grew leads me to suspect it must be different from the common Πευκος.” (*Walpole's Memoirs relative to Turkey*, &c. p. 236.) The *Pinus Laricio* is, I have no doubt, the tree here mentioned, and especially as it is known to grow in Greece, and has been found by Mr. Webb near the summit of Mount Ida, in Phrygia.

The branch represented in the plate is taken from a tree of this species growing in the Royal Gardens at Kew.

EXPLANATION OF TAB. 4.

- a. Male Catkin magnified.
- b. b. Antheræ, ditto.
- c. Point of leaf, ditto.
- d. Cone.
- e. Same, expanded by drought.





Pinus Pallasiana



TAB. 5.

5. PINUS PALLASIANA.

TARTARIAN PINE.

PINUS PALLASIANA, foliis geminis prælongis erectis rigidis canaliculatis, vaginis abbreviatis, antherarum cristâ subrotundâ convexâ repandâ, strobilis ovato-oblongis sæpiùs curvatis: squamis tuberculatis spinulâ terminatis.

Pinus Maritima, *Pall. Ind. Taur.* (*fide specim. in Herb. Lamb.*)

Pinus Pineæ. *Habl. Taur.* p. 97.

Pinus Halepensis. *Marsch. à Bieb. Fl. Taur. Cauc. II.* p. 408. (*exclus. synonym. præter Pall. et. Habl.*)

Pinus Laricio. *Marsch. à Bieb. Fl. Taur. Cauc. Suppl. III.* p. 623. (*exclus. synonym. præter Pall. et Habl.*)

Habitat in Tauriæ Chersonesi regionibus occidentalibus jugi montium excelsiorum ad Maris Nigri littora usque Yalta et Alushta. *Pallas, Marschall à Bieberstein.*

DESCRIPTIO.

Arbor ampla, magnitudine *Pini sylvestris*, at multò magis diffusa, ab apice juxta ferè basin ramos numerosos magnos divisos declinato-horizontali-patentes apicibus assurgentibus emittit; *inferioribus* ferè truncum ipsum æquantibus. *Cortex* rimosus, rugosus, fuscus, in laminis deciduus. *Lignum* compactum, album, centro brunneo-rubrum, resinâ turgidum, valdè nodosum. *Folia* gemina, conferta, erecta, rigida, semicylindrica, glabra, lucidula, lætè viridia, 5 pollices longa, margine asperè serrulata, suprâ canaliculata, apice mucrone cartilagineo pungente instructa. *Vaginæ* breves, vix semunciales, teretes, extùs squamis laxis tectæ, ad marginem lacerato-membranacæ, albæ, basi squamâ lanceolatâ longè cuspidatâ infernè persistente induratâ munitæ. *Amenta* terminalia, sessilia, basi squamis numerosis lanceolatis cuspidatis bracteata: *mascula* numerosa, simplicia, cylindrica, sesquiuncialia, densa; *staminibus* monadelphis; *antheris* linearibus, bilocularibus, infernè rimâ longitudinali rumpentibus, pollen granulosum sulphureum effudentibus, apice auctis appendice aut cristâ subrotundâ convexâ repandâ: *feminea* ovata, terna, basi squamis numerosis

lanceolatis membranaceis laxis densè instructa, viridia, erecta, denique fuscescentia, patentia; *squamis* brevibus, circumscriptione rotundatis, crassis, marginatis, retrorsum imbricatis, suprâ carinatis et convexis. *Strobili* plerumque terni, ovato-oblongi, 5-unciales, sessiles, diametro ad basin 2-unciales, declinato-penduli, cinerei, versus apicem subatenuati, decurvati: *squamis* induratis, ligneis, apice dilatatis, trapezoides, depresso—4 angulis, cinereis, centro tuberculo fusco conico spinulâ terminato elevatis. *Semina* obovata: *testâ* utrinque convexâ crustaceâ: *ala* tenuis, membranacea, falciformis, oblonga, acuta, integerrima.

THIS tree is confined to the central regions of the Crimea, forming considerable forests on the western declivity of the chain of lofty mountains which extend along the coast of the Black Sea. It is called *Tsaam* in the Tartar language, and forms a tree of considerable size. Its wood is very knotty and resinous, and very durable, according to Professor Pallas; but difficult to form into good planks on account of its knotty texture. The same distinguished traveller informs us, that the largest beams obtained from it are from 4 to 6 yards in length. The resin of this tree, which is produced in vast quantities, Pallas says, "has a pleasant odour, and is employed in fumigating, like that of the Mountain Pine procured from Moldavia."

This valuable tree was first raised in this country about fifteen years ago by Mr. Lee, from seeds communicated to him by Professor Pallas. Of all Pines this is the one best adapted for thin chalky soils, and maritime situations, and might be successfully employed for covering our barren sea downs, which at present produce nothing. A few trees, which I planted at Boyton about twelve years ago, are now thirty feet high, and very luxuriant; although the soil, in which they are, is scarcely two inches thick on a bed of solid chalk. The tree throws out branches almost to the base of the trunk, which, extending in a horizontal direction, protect the roots from the scorching rays of the sun in summer, and likewise serve to retain moisture in the soil. The present Duke of Marlborough planted, at White Knight's, from sixty to seventy young plants of this species, which have now attained considerable size. It is a remarkable fact, that, although the trees at Boyton House produce plenty of cones annually, the seeds have never yet ripened. This species is distinguished from *Pinus maritima* by the much greater size of its cones, which are most frequently curved and grow in twos or threes together, with their scales tubercular and terminated each by a small hard spinous point. The leaves of *P. Pallasiana* are likewise double the length of those of *maritima*, rigid and much thicker, and the crest of its anthers is twice as broad and more rounded. It also differs from *P. Laricio* by its straight and rigid leaves, furnished with a shorter sheath, and by its cones

being double the size, frequently curved with conical scales; and lastly, by the spreading and branchy habit of the tree itself. The cones of variety β represented in the plate are constantly straight, by which mark it differs from the variety α .

The specimen figured in the plate was taken from a fine tree growing at Boyton House.

EXPLANATION OF TAB. 5.

- a. Branch with Cones.
- b. Female Catkin.
- c. Young Cones.
- d. Male Catkin.
- e. Scale of the Female Catkin, showing the stigmas.
- f. Anther, crowned by its appendage, or crest.
- g. Cone.
- h. Scale of Cone, showing the seeds.
- i. Leaves with their sheath and stipule-like scale.
- j. Cone of variety β .

TAB. 6.

6. PINUS MARITIMA.

MARITIME PINE.

PINUS MARITIMA, foliis geminis tenuissimis, strobilis ovato-conicis glaberrimis solitariis pedunculatis.

Habitat in Europæ australis maritimis. Floret Junio.

Arbor 20-pedalis, ramosissima. *Folia* biuncialia, vel parùm longiora, angustissima, vaginâ brevissimâ. *Strobili* solitarii, pedunculati, cernui, ovati, superficie æquales, lævissimi ac nitidi. *Seminum* ala magna, securiformis.

The figure in the 6th Plate, representing the above species, was drawn from a specimen in the Sherardian Herbarium, to which the following note is annexed :—

P. maritima, foliis tenuissimis, conis albicantibus, brevibus, deorsum reflexis, in superficie æqualibus. *Michel.*

Pinastri alterum genus parvum, in maritimis, foliis capillamenti modo tenuissimis. *C. Isot.*

P. maritima, conis cinereis, planis. *Phytopin.*

This tree, so far as I can judge from one growing at Sion House, the only one I have been able to find, grows to the height of about twenty feet. The branches are very numerous, and bear long filiform leaves, resembling those of *P. halepensis*, which are more closely connected towards the extremities of the branches. The cones are of nearly the same size as in *P. rigida*, but rather smaller. They are so remarkably smooth and glossy, that they at once distinguish their species. Those which appear on Sherard's specimen hang downwards; but those which I obtained at Sion House point upwards: one of the latter is represented in the plate. In shedding their seeds, they seem to expand very little.

The following curious particulars relating to the *Pinus maritima* are extracted from Dr. Sibthorp's Papers, and published in Walpole's interesting Memoirs :—" Πεύκος, one of the most useful trees in Greece; it furnishes a resin (ρόζιν), tar, and pitch (πίσσα), all of considerable importance for œconomical purposes. Throughout Attica the wine is preserved from becoming acid by the means of the resin, which is employed in the proportion of an oke and half to twenty okes of wine. The tar and pitch for Ship-



Pinus maritima

building are taken from this tree and the Πίτρυς, the *Pinus Pineæ*. The resinous parts of the wood of the Πεύκος are cut into small pieces, and serve for candles, called δάδια. The cones, κολυοί, are sometimes put into the wine barrels; the bark is used in tanning hides. The wood is much employed by the carpenters in building."

Many curious pines were lost at Sion House, the seat of the Duke of Northumberland, some years ago, in consequence of standing in very dry and hot situations; among them was *P. Maritima*.

Sir James Edward Smith informs me, that several young plants of this species were raised in this country in the year 1821.

EXPLANATION OF TAB. 6.

- a. Cone from the Sherardian Herbarium.
- b, b. Scales of the same, with seeds.
- c. Separate seeds.
- d. Leaves.
- e. Point of a leaf magnified.
- f. Cone collected in Greece by the Hon. William Fox Strangways.
- g. Cone from a tree in Sion Gardens.

TAB. 7.

7. PINUS HALEPENSIS.

ALLEPPO PINE.

PINUS HALEPENSIS, foliis geminis tenuissimis, strobilis ovato-oblongis reflexis lævibus solitariis pedunculatis.

- P. halepensis*, foliis geminis, conis ovato-conicis, basi rotundatis, folio subbrevioribus: squamis obtusis. *Ait. Kew. v. 3. 367.*
P. halepensis, foliis geminis, filiformibus; strobilo ovato-oblongo, deorsum inflexo; squamis lævibus obtusis. *Desfont. Fl. Atlant. v. 2. 352.*
P. hierosolymitana, prælongis et tenuissimis viridibus foliis. *Duhamel Arb. v. 2. 126. n. 14.*
P. halepensis, foliis geminis, tenuissimis; conis obtusis, ramis patulis. *Mill. Dict. n. 8. Ic. 139. t. 208.*

Habitat in Europæ australis, & Asiæ, maritimis.
Floret Maio.

DESCRIPTIO.

Arbor humilis. *Folia* tenuissima, ferè præcedentis. *Amenta* mascula vix pedicellata; antherarum cristâ reniformi, antheris latiori, dentato-repandâ: *feminea* solitaria, pedunculata, mox reflexa, globosa, squamis deflexis. *Strobili* penduli, ovato-oblongi, tuberculosi, nec læves, neque muricati. *Semen* parvum, alâ securiformi, magnâ.

“*Arbor* 7-10 metr. *Trunci* diameter in adultis vix 3 decimetr. *Rami* expansi. *Folia* gemina, lævia, rigidula, fere filiformia, 8 centimetr. longa, læte viridantia, nec glauca ut in *P. sylvestri* Linn. *Strobilus* deorsum inflexus, ovato-oblongus, subacutus, 2-3 centimetr. crassus, 5-8 longus. *Squamæ* læves, obtusæ, apice duplo triplove latiores quam in *P. sylvestri*.” *Desfont.*

THE Figure was taken from a specimen in the Sherardian Herbarium, which has the following inscription annexed to it:—

“*P. maritima*, tuberculosis conis, spadiceis, lucidis. *Phytopin.* *P. maritima* prima. *Matth. Comm.*

Nomine seq. misit Micheli, *P. maritima*, foliis tenuissimis, conis longis, angustis, nitidis.”



This species in England is more like a shrub than a tree, and never grows to any great height in its native country. It is often greatly injured by the cold of our winters, and sometimes killed by intense frost. In 1789, all the Aleppo Pines that were in the Paris gardens perished, in consequence of the great cold of that year. This tree has been found in a wild state, however, in the southern parts of France, as we are informed by M. Desfontaines. That botanist observed it growing on the coast about Frejus. *P. halepensis* is very readily distinguished from other species, and after what has been quoted from authors above, it will only be necessary to remark, that the narrowness of the leaves, the very broad *apices* of the scales, and the obliquity of the fruit-stalks, are the principal characteristics.

Early in the spring, a palish resin flows in large quantities from the fissures in the bark, and it will sometimes cover the branches, and even the trunk completely. According to Miller, this species was first introduced into England by consul Cox, in the year 1732. There are a few Aleppo Pines three or four feet high growing in Burchell's nursery, at Fulham; they were raised from seed sent by Mr. Williams from France. A very flourishing tree is to be seen at Kew, and I have also seen a most beautiful tree, bearing abundance of cones in the greatest perfection, in the garden of Joshua Smith, Esq., at Stoke Park, Wilts; it is by far the largest of the species I have ever seen, and the only one which I have found in fruit. Mrs. Smith informs me that it was planted by herself about seventeen years ago. The soil is sandy, and well sheltered by surrounding plantations. This species is very scarce at present in England.

EXPLANATION OF TAB. 7.

- a. Male Catkin.
- a. The same, magnified.
- b, b. Anthera magnified.
- c. Ripe Cone.
- c. The same, expanded by drought.
- d. Seed with its wing.

TAB. 8.

8. PINUS MASSONIANA.

INDIAN PINE.

PINUS MASSONIANA, foliis geminis tenuissimis longissimis: vaginâ abbreviatâ, antherarum cristâ dentato-lacerâ.

Habitat in Chinâ

DESCRIPTIO.

Arbor stipulis ciliato-pilosis, viginis filamentoso-laceris. *Folia* 3-4-uncialia, angusta, canaliculata, margine scabra. *Amenta mascula* pedicellata. *Antherarum crista* plana, reniformis, dentato-lacera.

THE specimen represented in this plate is in the Banksian Herbarium, having been brought by Mr. Francis Masson from the Cape of Good Hope, where it was raised from seeds which had been sent from China.

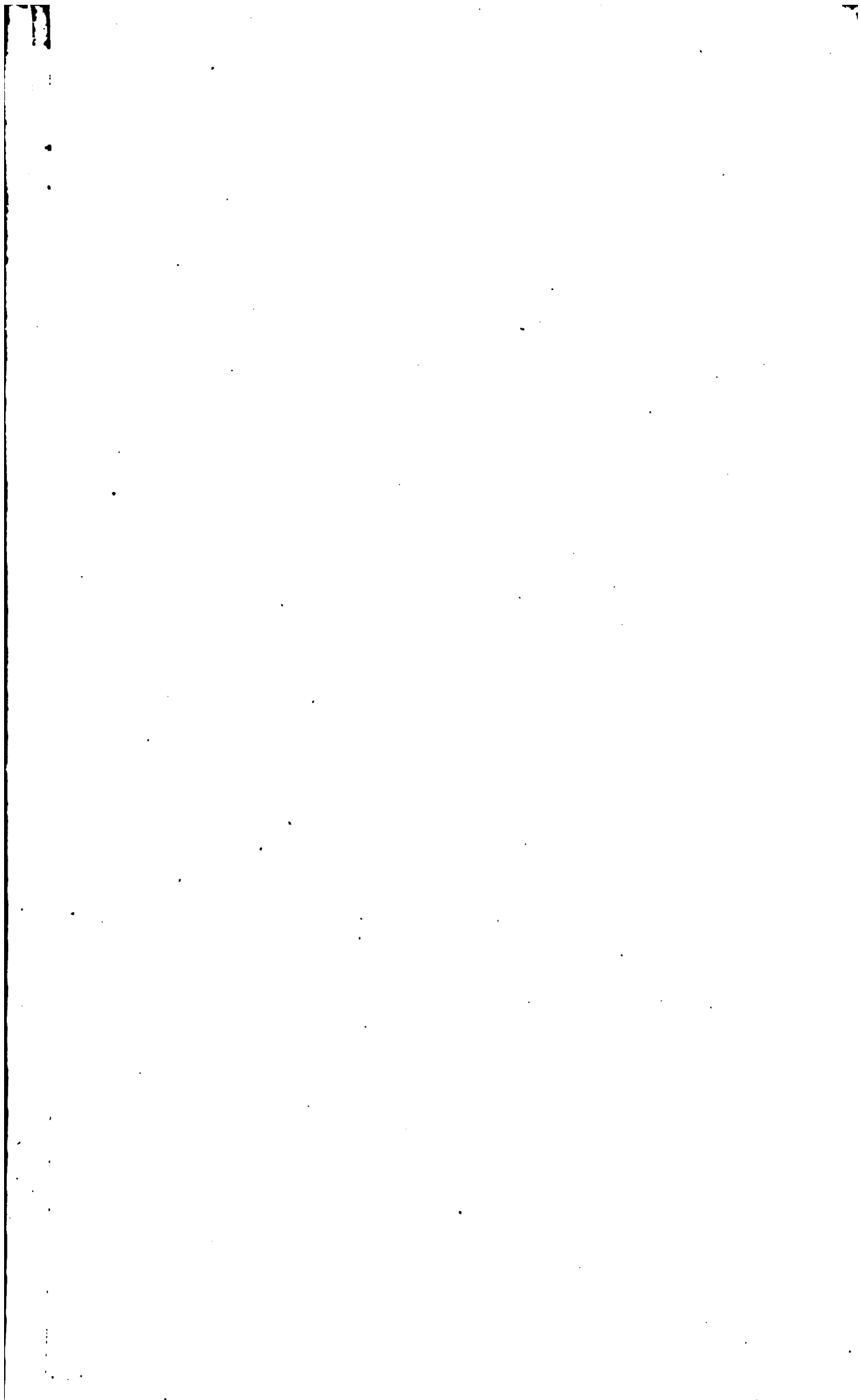
This is a very distinct species from Dr. Roxburgh's *P. longifolia*, specimens of which, and his description, I have lately obtained. I have not been able to obtain any fruit of *P. Massoniana*, nor any further information.

EXPLANATION OF TAB. 8.

- a. Stipulæ.
- b. Leaves with their short sheath.
- c. Male Catkin.
- d. Anthera magnified.



Pinus Massoniana.







Pinus Pinaster.

TAB. 9.

9. PINUS PINASTER.

THE PINASTER, OR CLUSTER PINE.

PINUS PINASTER, foliis geminis elongatis, strobilis verticillatis confertis ovatis sessilibus pendulis, antherarum cristâ rotundatâ.

P. Pinaster, foliis geminis, margine subasperis, conis oblongo-conicis, folio brevioribus, basi attenuatis, squamis echinatis. *Soland. MSS. Ait. Kew. v. 3. 367.*

P. sylvestris γ. *Linn. Syst. Reich. v. 4. 172.*

P. maritima altera. *Duhamel Arb. v. 125. n. 4. t. 29. Du Roi Harb. ed. Pott. v. 2. 59.*

Habitat in Europæ australis maritimis.
Floret Maio.

DESCRIPTIO.

Arbor excelsa, ramis patentibus, subfastigiatis. *Folia* quadriuncialia, recta, canaliculata, pungentia, lævia; vaginis ferè uncialibus. *Amenta mascula* pedicellata, elliptico-oblonga; antheris subpedicellatis, cristâ rotundatâ, indivisâ, dentato-lacerâ, latitudine antherarum. *Bracteæ* omnes setaceo-dentatæ. *Strobili* verticillati, numerosi, sessiles, demùm penduli, ovati, recti, magni, 5-7-unciales, squamis submuricatis. *Semina* parva, alâ, elongatâ, retusâ.

P. Pinaster is frequent in English plantations, and grows to a great height and size, being very showy, and bearing large shining cones; it is extremely ornamental, except in its more advanced age, when the branches become naked and very unsightly. The wood is soft, and therefore not so valuable as that of many other trees of this genus. On the mountains of Switzerland the native forests are seldom suffered to stand; being usually either cut into shingle for covering the roofs of houses, or employed for the extraction of pitch. In the south of France the young trees are made into stakes for supporting the vines. The *branches* grow at a wider distance from one another than those of *P. sylvestris*, and more horizontally. The *leaves* are much larger, thicker, and longer, and have a broad surface,

with a furrow running longitudinally. The *cones* are five or six inches long, and grow in very large clusters. Mr. Tucker, of Devonshire, I have been informed, has a tree that once bore as many as eighty in one bunch. The *seeds* are oblong, a little flattened at the sides, and have narrow wings. The largest trees of this species that I have seen are growing at Pain's Hill. The first *Pinus Pinaster* planted in England, was in Bishop Compton's garden at Fulham, and is still growing there in a healthy state.

EXPLANATION OF TAB. 9.

TAB. 9, was taken from a fine tree in the Royal Gardens at Kew.

- a. Male Catkin magnified.
- b, b. Antheræ magnified.
- c. Female Catkin.
- c. Same, magnified.
- d, d. Scales magnified.
- e. Ripe Cone



Pinus Pinea.

TAB. 10 & 11.

10. PINUS PINEA.

THE STONE PINE.

PINUS PINEA, foliis geminis, strobilis ovatis maximis, seminum alis abbreviatissimis, antherarum cristâ dentato-lacerâ.

P. *Pinea*, foliis geminis, primordialibus ciliatis, conis ovatis, obtusis subinermibus, folio longioribus, nucibus duris. *Soland. MSS. Ait. Kew. v. 3. 368. Willd. Berlin. Baumz. 209.*

P. *Pinea*, foliis geminis: primordialibus solitariis ciliatis. *Linn. Sp. Pl. 1419. Syst. ed. Reich. v. 4. 173. Hort. Cliff. 450. n. 2. Hort. Ups. 288. Mat. Med. n. 471. Gouan. Hort. 494. Mill. Dict. n. 2. Scop. Carn. n. 1197. Regn. Bot. Evel. Sylv. ed. Hunter. 266. fol. Villars Daup. v. 3. 806. Allion. Ped. v. 2. 177. Vitm. Sp. Pl. v. 5. 344.*

P. *Pinea*, foliis geminis, conis pyramidatis, splendentibus, squamis oblongis, obtusis, nocibus ovatis, alâ membranaceâ destitutis. *Du Roi Harbk. ed. Pott. 2. 52.*

P. *sativa*. *Bauh. Pin. 491. Blackw. t. 189. Duhamel Arb. v. 2. 125. n. 1. t. 27.*

P. *ossiculis duris, foliis longis. Bauh. Hist. v. 1. p. 2. 248.*

P. *domestica. Matth. Com. 87. Tabern. Ic. 936.*

Zinbellaum. Linn. Pflanzen Syst. 2. 351.

Le Pin. Regnault. Bot. Ic.

Habitat in Europâ australi et Africâ septentrionali.

Floret Maio.

Distinguitur foliis longis, geminis; strobilo ovato, obtuso, maximo; squamis crassis, apice latis, obtusis; nuce oblongo, magno, tereti. *Desfont. Fl. Atlant. v. 2. 352.*

DESCRIPTIO.

Habitus P. *Pinastri*, sed *folia* parùm minora, vaginis brevioribus. *Amenta* mascula vix pedicellata, antherarum cristâ reniformi, subbilobâ, dentato-lacerâ: *feminea* globosa, erecta, squamis deflexis,



a



b



c



d



e



e



f



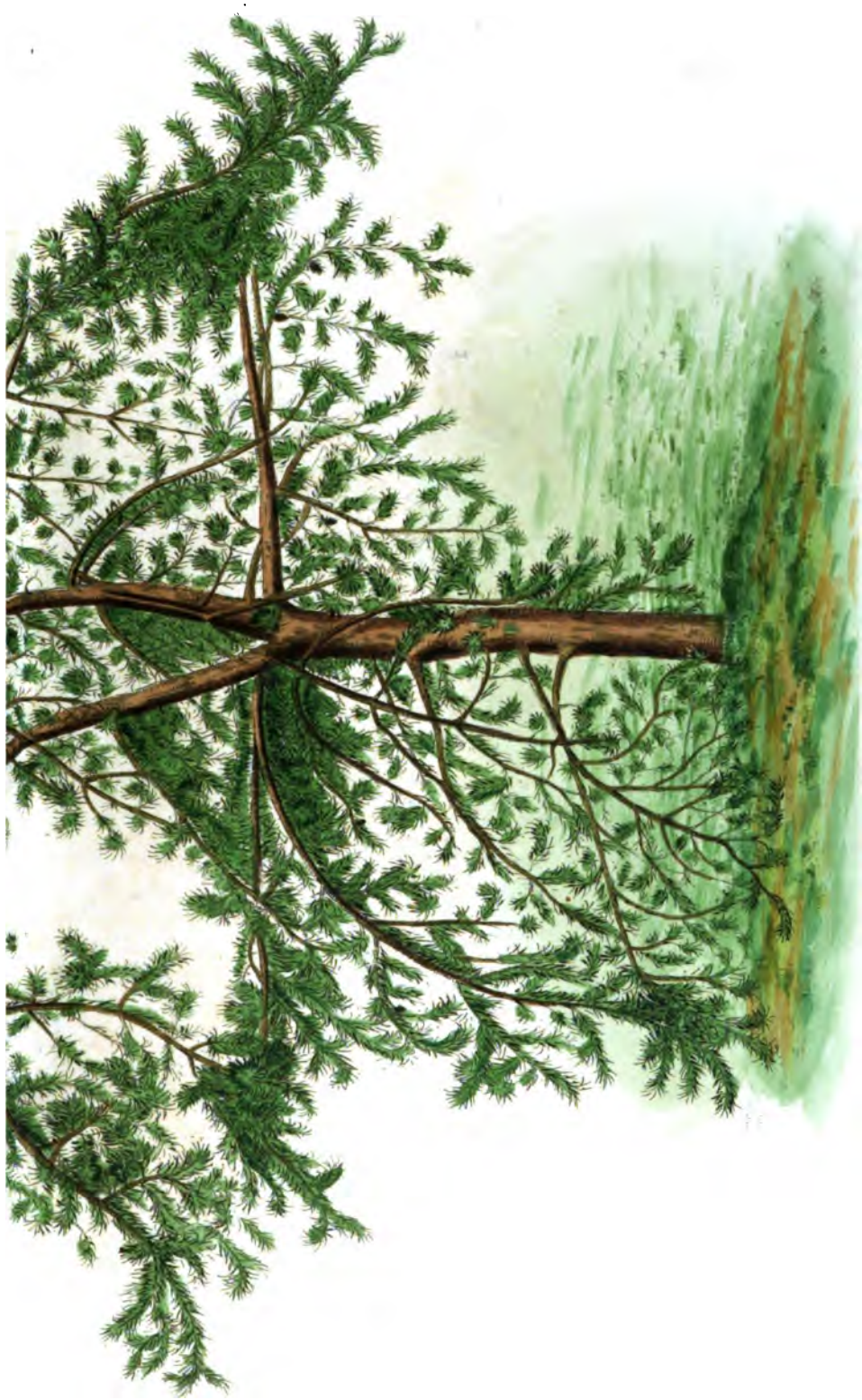
G



g

Pinus Pinea.





Pinus Inops

Drawn from a tree growing in the Royal Garden at Kew.

TAB. 12.

11. PINUS INOPS.

JERSEY PINE.

PINUS INOPS, foliis geminis, strobilis recurvis oblongo-conicis longitudine foliorum, aculeis squamarum subulatis rectis.

P. inops, foliis geminis; conis oblongo-conicis, longitudine foliorum, solitariis, basi, rotundatis; squamis echinatis. *Soland. MSS. Ait. Kew. v. 3. 367. Willd. Berl. Baumz. 208.*

P. virginiana, foliis geminis, conis oblongis, incurvis, aculeis squamarum rectis. *Du Roi Harbk. ed. Pott. v. 2. 47.*

P. virginiana, foliis geminis, brevioribus, conis parvis, squamis acutis. *Mill. Dict. n. 9. Wangenh. Beytr. 74.*

Habitat in Americâ septentrionali.

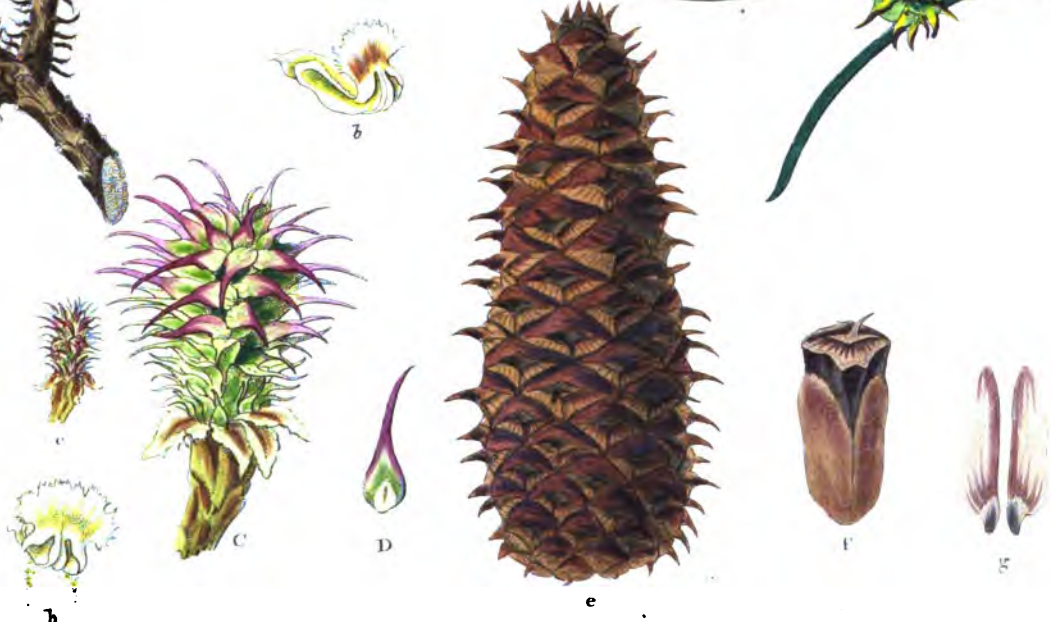
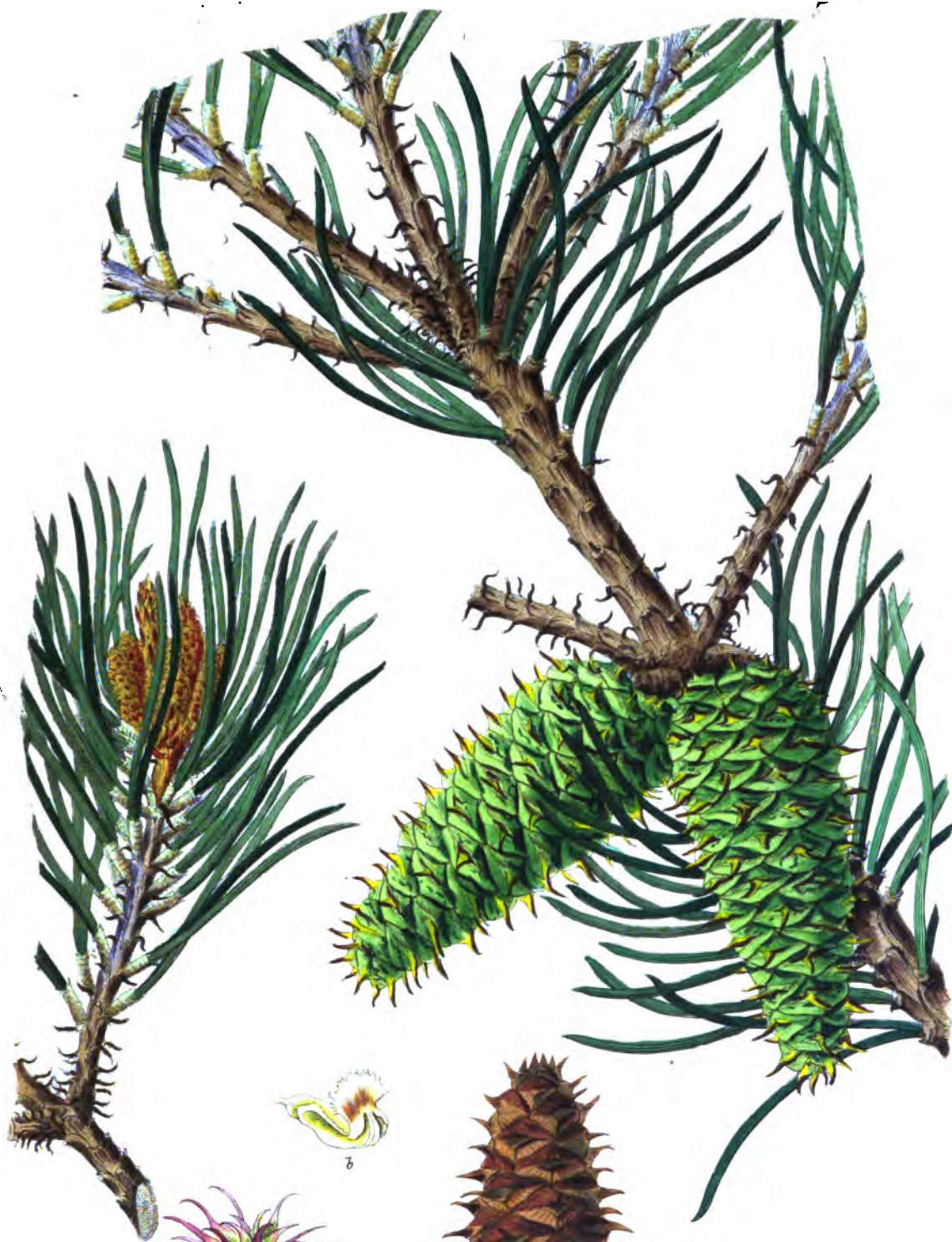
Floret Maio.

DESCRIPTIO.

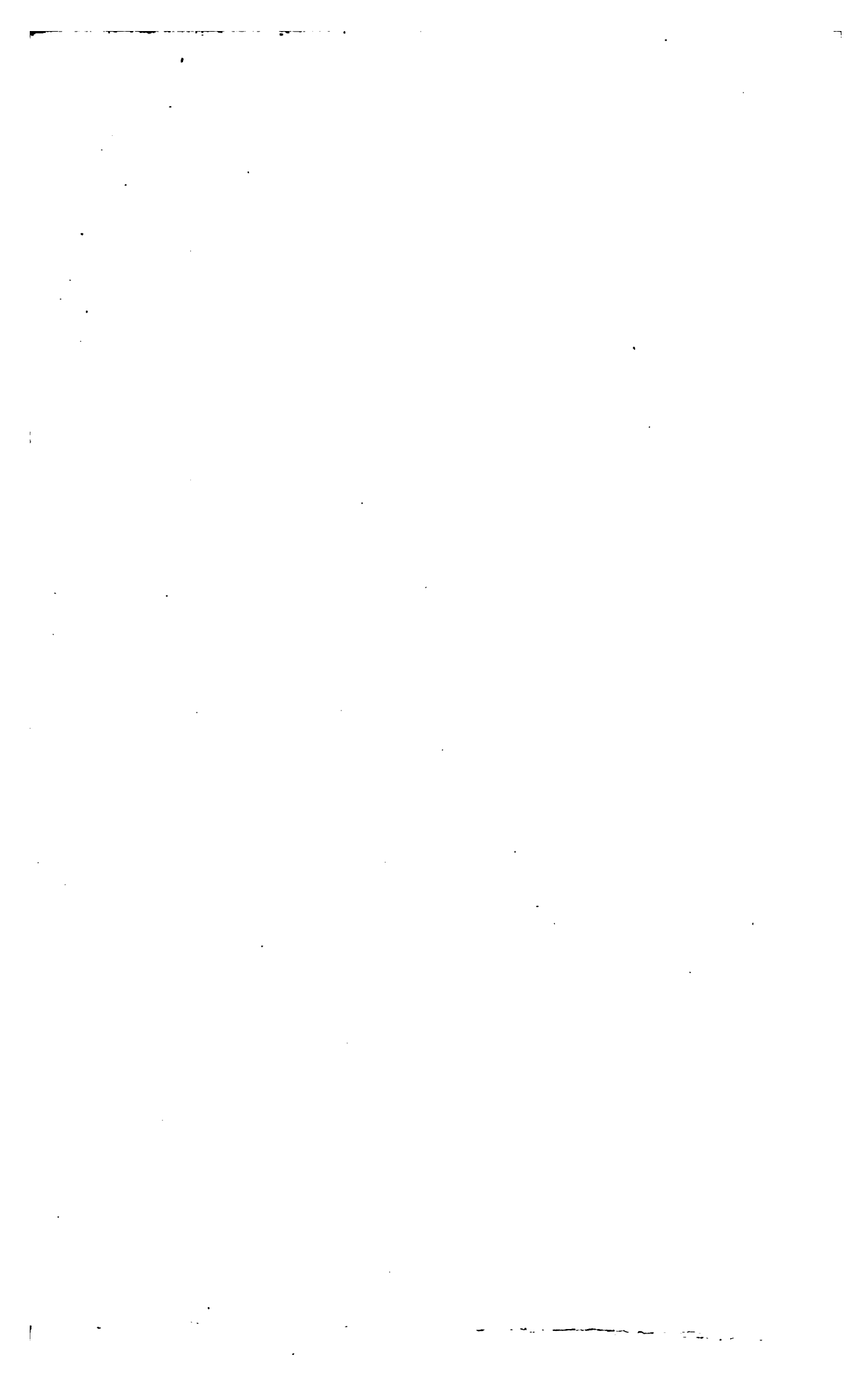
Arbor tortuosa, ramosa, 40-pedalis. *Folia* biuncialia, canaliculata, subtùs convexa. *Amenta* cylindræa; antherarum crista reniformis, dentato-lacera, antheris latior; *femineorum* squamæ acuminato-subulatæ, patentes, subrecurvæ. *Strobili* brevius pedunculati, solitarii vel bini, recurvato-penduli, ovato-cylindræi, acutiusculi, magnitudine varii, squamis mucronato-spinosis, spinis rectis, vel parùm recurvis.

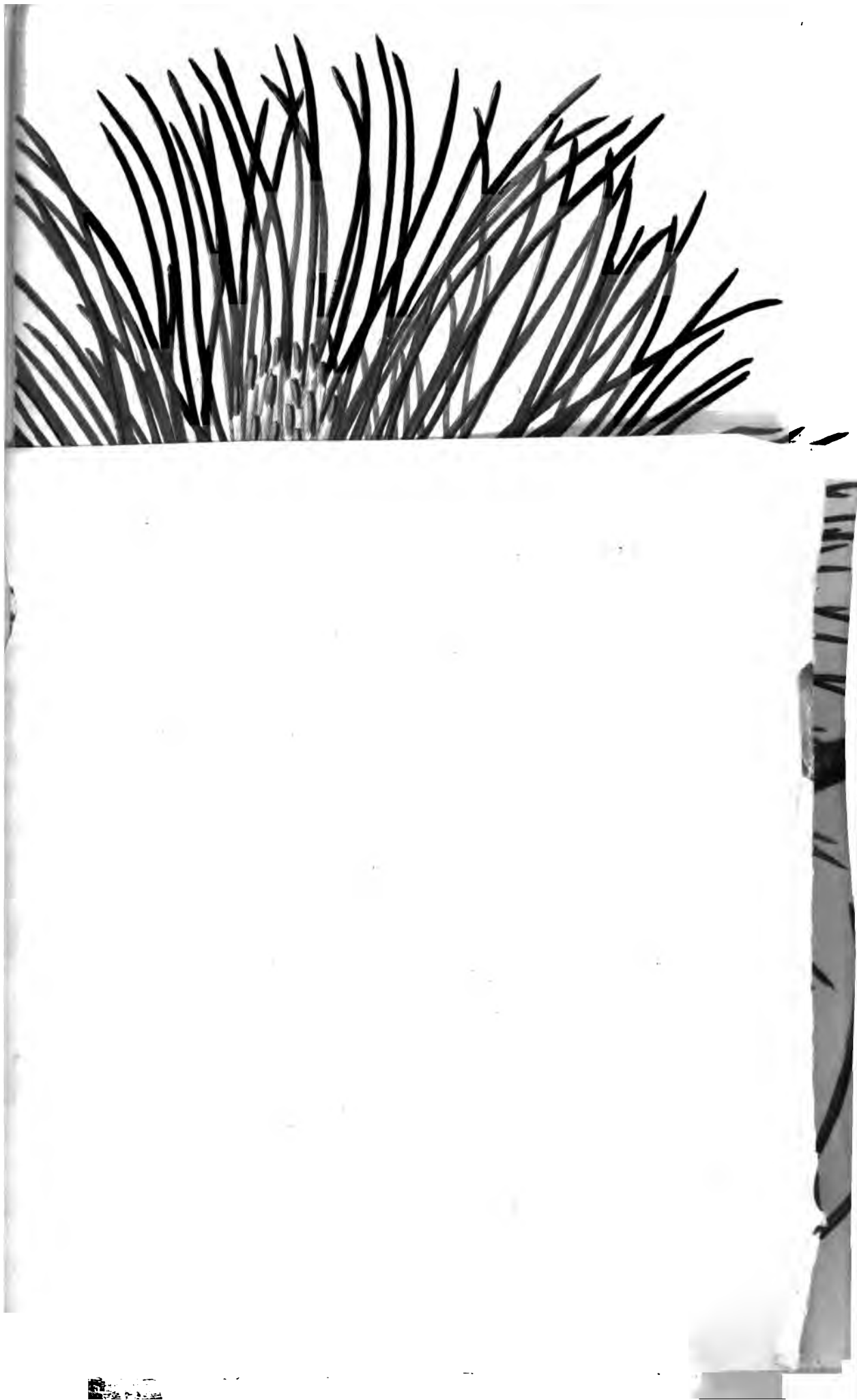
THE specimen from which the figure is taken was procured at Pain's Hill.

This species, Wangenheim remarks, is found principally in the interior parts of North America, upon mountains and hills, in a dry soil, composed of sand and pebbles. Its stem is seldom very straight: the length of it is usually from fifteen to twenty feet, and the circumference about one foot and a half. It divides into several branches, growing at some distance from one another, but not in a very orderly manner. The entire height is commonly almost forty feet. The *bark* is deeply cracked, of a brownish colour, and the *wood* is of a reddish yellow. In regard to durability, the wood is apt to fail, but it abounds with resin, which, working through the fissures in the bark, gives the branches the appearance of being candied over with sugar, so that the valuable part of the tree is its pitch and tar. The



Pinus eriops.







TAB. 13.

12. PINUS RESINOSA.

PITCH PINE.

PINUS RESINOSA, foliis geminis, strobilis ovato-conicis sessilibus ternis, squamis medio dilatatis inermibus.

P. resinosa, foliis geminis, conis ovato-conicis, basi rotundatis, solitariis, folio dimidio brevioribus, squamis inermibus. *Soland. MSS. Ait. Kew. v. 3. 367.*

P. Canadensis bifolia, conis mediis ovatis. *Duhamel Arb. v. 2. 125. n. 8.*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor mediocris. Folia 4-5-uncialia margine apiceque scabriuscula, subtus subcarinata. Vaginæ ferè unciales, demùm corrugatæ. Amenta mascula formosa, purpurascentia; antherarum crista convexa, reniformis, dentato-lacera, antheris angustior: feminea ovata, obtusa. Strobili bini vel terni, patentes, ovati, obtusi, tuberculosi, inermes, squamis medio dilatatis.

THE figure was taken from a specimen procured at Pain's Hill, where, as also at Caen Wood, (in a small island,) this species grows in a very flourishing state. But the greatest number of these trees are at Sion-House, the seat of the Duke of Northumberland, where the first that grew in England were raised. Though *P. resinosa* is rarely to be found in our Plantations, yet it is certainly entitled to more general cultivation, being of a very elegant appearance, and remarkable for the fragrance of its resin, which is very abundant. From the size of those trees which I have seen, I conclude that this species cannot produce valuable timber. It flourishes best, like many others of this tribe, in a moist situation, and a light, sandy soil. One of the most distinctive characters of *P. resinosa* is the uncommon length of the *vaginæ* or sheaths of the leaves, which resemble in their form those of *P. sylvestris*, but are generally much longer

The *inflorescentia* assumes a dark red colour, and is larger than in most other Pines. The *Cones* are shorter than those of *P. sylvestris*, and more obtuse. The bases of the *squamæ* are very blunt, and internally they exhibit the same colour as the Flowers.

EXPLANATION OF TAB. 13.

- a. Male Catkin.
- a. Same, magnified.
- b, b. Antheræ, magnified.
- c. Transverse section of the Antheræ, magnified.
- d. Female Catkin.
- d. Same, magnified.
- e. Scale of the same, magnified.
- f. Ripe cone.
- g, g. Its scales.
- h. A seed
- i. Leaves with their sheath.
- k, k. Point of leaf magnified.



Pinus variabilis

TAB. 14.

13. PINUS VARIABILIS.

VARIABLE-LEAVED BASTARD PINE.

PINUS VARIABILIS, foliis binatis ternatisque, strobilis ovato-conicis sub-solitariis, squamarum aculeis incurvis.

P. Tæda variabilis γ . *Ait. Kew. v. 3. 368.*

P. *echinata*, prælongis foliis tenuioribus, cono echinato gracili. *Mill. Dict. n. 12. Wangenh. Beyt. 74.*

P. *echinata*. *Marshall Arb. Amer. 100.*

P. *echinata*, foliis geminis et ternis, conis oblongis incurvis; aculeis squamarum reflexis. *Du Roi Harbk. ed. Pott. v. 2. 51.*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor mediocris. *Folia* binata vel ternata, biuncialia, canaliculata, margine nervoque scabra, apice subcarinata. *Vaginæ* breves, strictæ, minùs corrugatæ. *Amenta* nondùm vidi. *Strobili* solitarii, recurvato-penduli, angustè ovati, muricati, spinis subincurvatis, squamis medio dilatatis.

I HAVE never seen more than two trees of this species in England; one at Pain's Hill, where I procured specimens for the engraving, the other at Kew.

The native situation of *P. variabilis* is the sea-shore of North America, or at no great distance from it, in a sandy, but mixed kind of soil. In New York, under the forty-first degree of north latitude, its height is seldom above forty feet, and the shaft or trunk not more than fifteen or twenty, parting then into branches pretty distant from one another. The *bark* is brownish and deeply cracked. The *wood* has a sponginess and lightness which deprives it of durability, and renders it useless in building, or indeed for any purposes of a similar kind, but it is tolerably full of resin, so that the Americans employ it for its tar and pitch. The *leaves* are two inches long, and pointed; in colour, dark green. The *flowers* appear at the beginning of May, and the seed ripens in November. The *cone* is about three inches long, and two thick at the base; it is rather bent at the top. The scales have a yellowish-brown tinge, and there are thorny points of a strong woody texture projecting from them. The seeds are smaller than in *P. sylvestris*.

EXPLANATION OF TAB. 14.

a. Scales of a ripe cone. b. Seed. c. Point of a leaf magnified.

TAB. 15.

14. PINUS TÆDA.

FRANKINCENCE PINE.

PINUS TÆDA, foliis ternis elongatis, strobilis deflexis: spinis inflexis, vaginâ foliorum elongatâ.

P. *Tæda*, foliis trinis, conis oblongo-conicis, folio brevioribus, aggregatis, squamis echinatis. *Soland. MSS. Ait. Kew. v. 3. 368. Linn. Sp. Pl. 1419. Syst. ed. Reich. v. 4. 173.*

P. *Tæda*, foliis ternis. *Gron. Virg. 2. 152. Wangenh. Beyt. 41.*

P. foliis longioribus tenuioribus ternis, conis maximis largis. *Mill. Dict. n. 11. Evel. Sylv. ed. Hunter. 264.*

P. foliis longissimis ex unâ thecâ ternis. *Colden. Novebor. 230. in Act. Soc. Reg. Sc. Ups. 1743.*

P. *Tæda*, foliis ternis, conis pyramidatis; squamis oblongis obtusis reflexis. *Du Roi. Harbk. ed. Pott. v. 2. 63.*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor humilis, ramosissima. *Folia* omnia ternata, spithamæa, angustissima, suprâ nervo elevato, minùs canaliculata, subtùs planiuscula, margine scabra. *Vaginæ* unciales, parùm rugosæ, apice dilatatæ et laceræ. *Amenta mascula* cylindræa, densa; antherarum crista orbiculata, repanda, antheris paulò latior: *feminea* subsessilia, ovata. *Strobili* sæpiùs bini, recurvato-patentes, ovati, acutiusculi, muricati, spinis incurvato-patentibus, acutissimè pungentibus.

PLAINS consisting of dry sand, and sea coasts, in North America, are abundantly stocked with this species of Pine. As the soil is too meagre to afford much nourishment, the trees growing in it (as we are informed by Wangenheim) remain low, full of branches, and attain but moderate strength. Their wood is of short duration, being apt to become worm-eaten, and rotten. If they grow, however, in moist and low places, they rise to a considerable height and strength, and occasionally afford timber for ship-building. The *bark* is greyish, rough, and cracked on old trees;



Pinus taeda.

f.

the *leaves* generally measure from five to six inches in length, but often more. They are pointed, flat on the upper surface, furrowed on the under, pliable, and of a light green colour; there are always three in one sheath.

This is certainly a very distinct species from *P. rigida*, (as Miller has made it,) differing essentially in the loose texture of its cones, their slight attachment to the branches, the incurvature of the spines of the scales, and the length of the sheaths or *Vaginæ* of the leaves, which are longer than in *P. rigida*. The cones of the latter are of a much harder texture, and will remain on the tree for several years, requiring some degree of force to detach them from it, whereas the cones of *P. Tæda* appear to fall off the tree soon after they are ripe. The *flowers* appear in Pennsylvania, under the 4th degree of north latitude, towards the end of August. The *cones*, which require almost two years to arrive at maturity, are pyramidal, and from two to four inches long. The *scales* shoot into a woody, inflected point, and contain two *kernels* which are less than those of *P. sylvestris*, and ripen at the end of November, but the cones open and drop their seed only in warm weather. I could never find any male flowers on either of the two trees at Sion House, though they are so flourishing. Perhaps this circumstance is to be attributed to the dryness of the situation, and the lightness of the soil.

In regard to climate, our winters would seem to suit this species extremely well, and if it could be made to thrive on some of our heaths, the cultivation would be advantageous, if it were only for the tar, pitch, and turpentine. But to plant it in good soil would be unprofitable, because other pines planted under such circumstances, are far preferable on account of their greater durability.

EXPLANATION OF TAB. 15.

TAB. 15 is taken from a tree in the garden of the Duke of Northumberland, at Sion House.

- a. Male Catkin, taken from a specimen brought from America by Mr. John Fraser.
- a. Same, magnified.
- b, b. Antheræ magnified.
- c. Ripe Cones in their proper position, from a tree in the garden of the Duke of Northumberland, at Sion House.
- d, d. Scales of the same.
- e. Seeds.
- f. Cone of *P. Tæda alopecuroidea*, Hort. Kew. from a specimen preserved in spirits in the Banksian collection.

15. PINUS RIGIDA.

THREE-LEAVED VIRGINIAN PINE.

PINUS RIGIDA, foliis ternis, strobilis ovatis confertis, squamarum spinis reflexis, vaginâ foliorum abbreviatâ.

- P. Tæda rigida* β. *Ait. Kew. v. 3. 368. Willd. Berl. Baumz. 210.*
P. rigida, foliis ternis, conis pyramidatis, confertis; squamis oblongis acutis. *Du Roi Harbk. v. 2. 60. Wangenh. Beyt. 41.*
P. rigida, foliis ternis, conis longioribus, squamis rigidioribus. *Mill. Dict. n. 10.*
P. Canadensis trifolia, conis aculeatis. *Duhamel Arb. v. 2. 126. n. 16.*
P. rigida. Marshall Arb. Amer. 101.

Habitat in America septentrionali.

Floret Maio!

DESCRIPTIO.

Arbor excelsa. Folia breviora, latiora, et rigidiora quàm in præcedente, at nervo margineque similia. Vaginæ vix semi-unciales, imbricatarugosæ. Amenta mascula crassiuscula, purpureo-lutea, densa; antherarum crista reniformis, repanda, antheris latior: fæminea ovato-subrotunda. Strobili aggregati, undique patentes, ovati, magnitudine varii, muricati, spinis reflexis, acutis.

THIS Pine grows in Virginia, Maryland, and Pennsylvania, more abundantly than in districts further northward. Mr. Menzies found it in California, and I have been favoured by that gentleman with a large, full-grown cone gathered on the coast of that country, during his circumnavigation with Captain Vancouver, who brought over an immense collection of plants and drawings collected in that voyage. In growth and strength *P. rigida* is equal to *P. sylvestris*, but the wood is more spungy, and used for ships, and other buildings, only for want of better. It does not usually inhabit mountainous places, but dry sandy plains. The leaves distinguish the species sufficiently from any other, being from two to three inches long, pointed, smooth on the under surface, and furrowed above; there are very



Pinus rigida.



fine serratures on the edges, and the whole texture is strong. The sheaths of the leaves are much shorter than in *P. Tæda*.

In Pennsylvania, says Wangenheim, the *flowers* appear at the beginning of May, and ripe *seed* is procured in October. The *cones* are of a yellowish-brown colour, tapering, and a little curved toward the top. Their length is between three and four inches. Every *scale* has a woody point, which is reflexed.

Our figure is taken from specimens procured at Pain's Hill. There is also a variety of this species with smaller cones, some trees of which are growing at Pain's Hill.

EXPLANATION OF TAB. 16.

- a, a. Male Catkin, magnified.
- b, b. Antheræ, ditto.
- c. Female Catkin.
- d, d. Scales of ditto, magnified.
- e. Unripe Cone.
- f. Ripe Cone.
- g. Scale.
- h. Seed.
- i, i. Points of Leaves, magnified.
- k. Cone of the small-fruited variety of *P. rigida* from Pain's Hill.



Pinus pungens.



Pinus serotina.

TAB. 18.

17. PINUS SEROTINA.

POND PINE.

PINUS SEROTINA, foliis ternis prælongis erectis, amentis masculis erectis, strobilis solitariis subrotundo-ovatis : squamis depressis mucronulatis.

Pinus Serotina. *Mich. Fl. Amer. Bor. 2. p. 205. Arb. 1. p. 86. t. 7.*
Pursh. Fl. Amer. Sept. 2. p. 643.

Habitat in Pennsylvaniæ et Carolinæ paludosis et maritimis.

DESCRIPTIO.

Arbor 35-40-pedalis. *Rami* remotissimi. *Folia* terna, erecta, semi-cylindracea, tenuiora, spithamæa : *vaginis* integris, apice coarctatis, semuncialibus. *Amenta mascula* erecta, incumbentia. *Strobili* solitarii, sessiles, plerumque oppositi, subrotundo-ovati, crassi, 2 v. 3-unciales : *squamis* depresso-tetragonis, spinulâ exiguâ mucronulatis.

THIS tree, Michaux informs us, is found only in the southern states of North America, where it grows on the edges of ponds and swamps, and also on the sea-coast. The length of its leaves, and the size and shape of its cones, distinguish it essentially from every other species. After *P. palustris*, this has the longest leaves of all the North American pines. Pursh appears to have been entirely unacquainted with this species, as he has confounded with it *P. Tæda alopecuroides*, which is only a variety of *P. rigida*, characterized by its much shorter and stouter leaves, and its ovate-oblong, much narrower, aggregated cones.

Michaux states, that the trunk of the tree is only from fifteen to eighteen inches in diameter, and so full of sap, as to render it unfit for any useful purpose.

In Lord Grenville's extensive pinetum, at Dropmore, there is a fine specimen of this species, which does not appear to be so hardy as many others of its genus; but this is not so material, it being only fitted, as an ornamental tree, for lawns and pleasure-grounds, where its long, delicate leaves cannot fail to attract attention.

Our figure is copied from Michaux, as well as the chief part of the above account.

EXPLANATION OF TAB. 18.

a. Leaves.

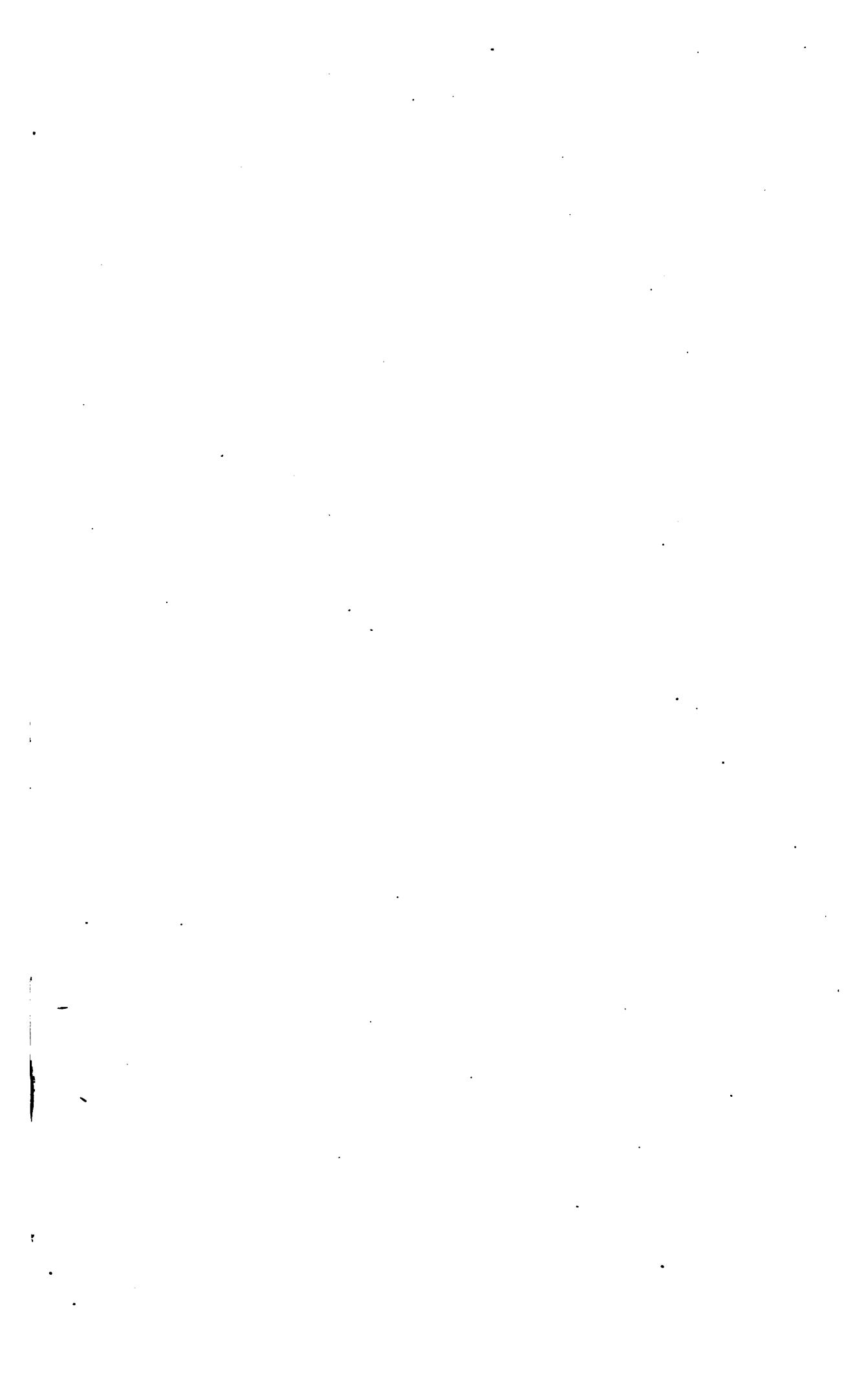
b. Seed.



Pinus patula



Pinus Toccole



TAB. 20.

19. PINUS TEOCOTE.

TWISTED-LEAVED PINE.

PINUS TEOCOTE, foliis ternis compressis flexuosis scabris: vaginis unguicularibus, strobilis ovatis læviusculis.

Pinus Teocote. Schiede et Deppe in Schlecht. Linnæa, 5. p. 76.

Habitat in adscensu montis Orizaba. *Schiede et Deppe.*

DESCRIPTIO.

Ramuli densè foliosi, epidermide persistenti. *Gemmæ* squamis lanceolatis, acuminatis, ciliato-laceris imbricatæ. *Folia* terna, erecta, rigida, compressa, acuta, tortuosa, lætè viridia, suprà bicanaliculata, subtùs leviter convexa, lævissima; *angulo intermedio* parùm prominenti cum *marginibus* crenulatis, scabris. *Vaginæ* cylindricæ, unguiculares, persistentes, margine laceratæ. *Strobili* ovato-oblongi, cernui, læviusculi, vix tripollicares: *squamis* apice dilatatis, subtrapezoides, valdè depressis; in *strobilo juniore* semper muticis.

Our figure was taken from specimens communicated by Messrs. Schiede and Deppe last year.

EXPLANATION OF TAB. 20.

- a. Leaves.
- b. Scale of the cone.
- c. Seed.

TAB. 21.

20. PINUS LEIOPHYLLA.

SOFT-LEAVED PINE.

PINUS LEIOPHYLLA, foliis quinis tenuissimis: vaginis caducis, strobilis ovatis pedunculatis: squamis depressis truncatis.

Pinus leiophylla. *Schiede et Deppe MSS.*

Habitat in Mexico inter Cruzblanca et Jalacinga (*reg. frigid.*) *Schiede et Deppe.*

DESCRIPTIO.

Ramuli epidermide decidua. *Gemmae* squamis lanceolatis acuminatis rufis, margine albis scariosis laceris imbricatæ. *Folia* quina, tenuissima, triquetra, mucronata, suprâ bicanaliculata, subtùs planiuscula, lævigata, angulis tenuissimè serrulatis, lineis punctatis conspicuis instructa, undulata, nec flexuosa, cæruleo-viridia, 4-uncialia. *Vaginæ* è squamis pluribus ligulatis, ciliato-laceris, spadiceis, laxè obvolutis, caducis compositæ. *Strobili* ovati, penduli, vix bipollicares, pedunculo crasso brevissimo suffulti: *squamis* apice dilatatis, trapezoideis, truncatis, depressis, parùm excavatis; in *strobilo juniori* tamen elongato-mucronatis! *Semina* parva: *alâ* oblongâ, fuscâ.

THIS very distinct species was discovered by Messrs. Schiede and Deppe, and from specimens communicated by them our figure was derived.

The leaves are precisely those of the *Strobis* tribe, with which this species also agrees in having a caducous sheath. The male flowers I have not seen. Young plants of this species are now in the splendid collection at Dropmore, raised from seeds communicated by me to the noble proprietor.

EXPLANATION OF TAB. 21.

- a. Leaves.
- b. Scale of the Cone.
- c. Seed.





Pinus leiophylla



Pinus Montezumae.

21. PINUS MONTEZUMÆ.

ROUGH-BRANCHED MEXICAN PINE.

PINUS MONTEZUMÆ, foliis quinis erectis triquetris: vaginis pollicaribus persistentibus, strobilis oblongis spithamæis tuberculatis.

Pinus occidentalis. Kunth in Humb. et Bonpl. Nov. Gen. et Sp. Plant. 2. p. 4. Schiede et Deppe in Schlecht. Linnæa, 5. p. 76.

Habitat in Orizabâ aliisque montibus Mexicanorum. Humboldt et Bonpland. Schiede et Deppe.

DESCRIPTIO.

Arbor excelsa. *Ramuli* cortice crasso, scabro, squamis stipularibus, persistentibus, lanceolatis, longè acuminatis, ciliato-laceris undique copiosè instructi. *Folia* sæpiùs quina, rariùs terna v. quaterna, erecta, undulata, rigidula, triquetra, calloso-mucronata, glauco-viridia, lineis plurimis parallelis punctatis notata, suprâ leviter bicanaliculata, subtùs planiuscula, spithamæa: *angulis* crenulatis, scabris. *Vaginæ* pollicares v. sesquipollicares, persistentes: *squamis* ramentaceis, margine ciliato-laceris, spadiceis. *Amenta mascula* cylindræa, pollicaria, basi squamis pluribus ovalibus ciliatis imbricatis munita. *Anthetarum appendice* rotundatâ, convexâ, coriacea, margine membranacea, erosè crenulatâ. *Strobili* oblongi, tuberculati, spadicei, basi crassiore, apicem versus parùm attenuati, spithamæi: *squamis* apice elevatis, obtusè tetragonis, truncatis, crassissimis.

BARON HUMBOLDT has referred this to *Pinus occidentalis* of Swartz, but I have ventured to separate it, as the size of the cones, which may in general be relied on, as indicating a specific distinction in this genus, differs so much. Those described by Swartz, and represented by Plumier, and in the new edition of Duhamel by M. Loiseleur-Deslonchamps are only three inches long; while in the present plant they are more than double that length. Our knowledge of *P. occidentalis* is still very imperfect; but as the species of this genus have seldom an extensive geographical range, there is little probability of their proving identical. The figure is derived from fine specimens sent me by Messrs. Schiede and Deppe.

EXPLANATION OF TAB. 22.

a. Leaves.

b. Cone.

22. PINUS OCCIDENTALIS.

WEST INDIAN PINE.

PINUS OCCIDENTALIS, foliis quinis gracilibus: vaginis persistentibus, strobilis conicis folio dimidio brevioribus: squamis apice incrassatis minutissimè mucronatis. *Duham. Arb. ed. Loisel. 5. p. 250 tab. 72. bis, f. 2.*

Pinus occidentalis. Swartz. Prod. 103. Fl. Ind. Occid. v. 2. 1230.

P. foliis quinis ab eodem exortu. Plum. Cat. 17. Plant. Amer. 154. tab. 161. Wild. Sp. Pl. 4. p. 501. Poir. Dict. Encycl. 5. p. 342.

Larix Americana, foliis quinis ab eodem exortu. Tournef. Inst. 586.

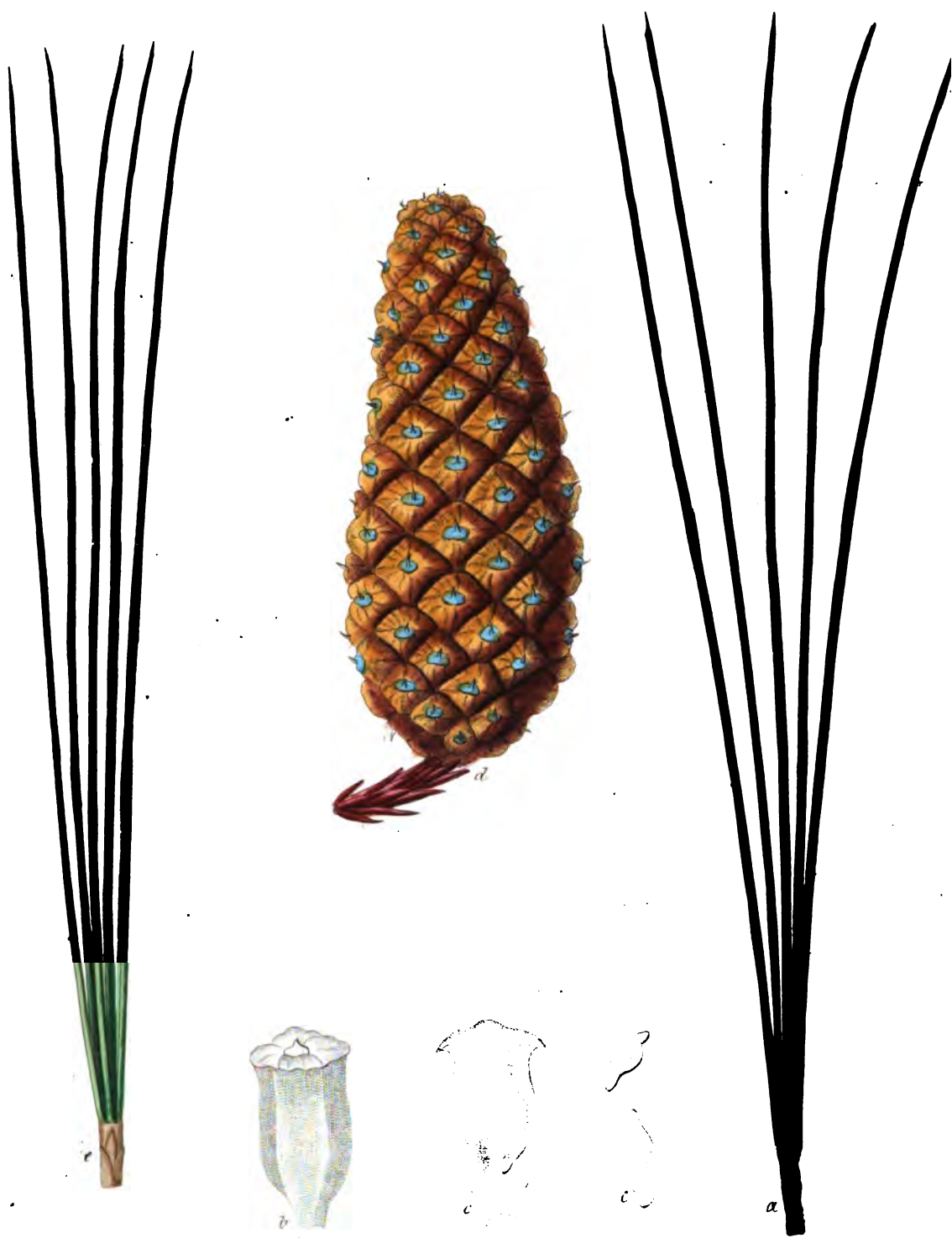
Habitat in montibus Hispaniolæ, Quartier du Pin.

As DR. SWARTZ seems only to have seen imperfect specimens of this species, I have preferred the character of it given by M. Loiseleur-Deslonchamps in the new edition of Duhamel, derived from a specimen with perfect cones preserved in the herbarium of M. Poiteau, who gathered it himself in its native country. The following is the account of M. Loiseleur:

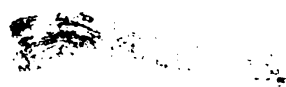
“ Les feuilles de ce Pin sont très-grêles, longues de six à huit pouces, réunies cinq dans une gaine longue de six à huit lignes, et qui n'est pas caduque, comme dans le Pin Strobilus et Cembra. A leur base et une écaille lancéolée, longue de quelques lignes. Les cônes ont environ trois pouces de longueur; leurs écailles sont renflées à leur extrémité supérieure, anguleuses, ombiliquées à leur sommet et chargées d'une petite pointe droite, très-menue. Ce Pin croît sur les montagnes, dans l'île de Saint-Domingue; j'en ai vu un échantillon avec des fruits dans l'herbier de M. Poiteau, qui l'avait recueilli dans son lieu natal. Il y a lieu de croire qu'il pourrait s'acclimater, dans les parties méridionales de la France, puisqu'il tombe quelquefois de la neige sur les montagnes où il est indigène.”

EXPLANATION OF TAB. 23.

- a. Leaves with their sheath, from Plumier.
- b, c. Scale of Cone and Seed, ditto.
- d. Cone, from Duhamel.
- e. Leaves with their sheath, ditto.



Pinus occidentalis.



TAB. 24 & 25.

23. PINUS PALUSTRIS.

SWAMP PINE.

PINUS PALUSTRIS, foliis ternis longissimis, strobilis sub-cylindraceis muricatis, stipulis pinnatifidis ramentaceis persistentibus.

P. palustris. Soland. MSS. Ait. Kew. v. 3. 368. Willden. Berl. Baumz. 211.

P. palustris, foliis ternis, conis oblongo-pyramidatis: squamis oblongis obtusis. Du Roi. Harbk. ed. Pott. v. 2. 66.

P. palustris, foliis ternis longissimis. Mill Dict. n. 14. Wangenh. Beyt. 73.

P. Americana palustris, trifolia, foliis longissimis. Hort. Angl. 88. Duhamel. Arb. v. 2. 126. n. 18.

P. palustris. Marsh. Arb. Amer. 100.

Habitat in Americæ septentrionalis paludosis.

DESCRIPTIO.

Arbor mediocris, gracilis. *Folia* longissima, ferè pedalia, undique patentia, formosa, subtùs convexa, ecarinata, suprà nervo prominulo à basi ad apicem notata, margine nervoque scabra. *Vaginæ* unciales, corrugatæ, laceræ. *Stipulæ* elegantèr pinnatifidæ, persistentes. *Amenta mascula* cylindracea, elongata, purpurascentia; *feminea* nondùm vidi. *Antherarum crista* rotundata, convexa, subdenticulata, antheris angustior. *Strobili* spithamæi, subcylindracei, recti, tuberculosomuricati, spinis brevibus, incurvis, obsoletis.

I AM indebted to Mr. Fairbairn, of Chelsea Gardens, for the cone, from which that in the plate was drawn, and for the branch of Male Flowers, to that indefatigable collector, Mr. John Fraser, who in three several voyages to America brought back each time a large collection of plants; and by whose means many new species adorn our gardens. *P. palustris* grows only in the warm and moderate climates of North America. Wangenheim found it in Pennsylvania, as far northward as forty degrees latitude, but there, he remarks, it is generally solitary and the offspring of cultivation. In Virginia and Carolina it grows in greater numbers. Dry, elevated

land does not seem to suit it, but low marshy spots sufficiently sheltered, says Wangenheim. Its height is between forty and fifty feet, and the diameter of the trunk nearly two; in proportion, therefore, to other species, this tree is inconsiderable. The *bark* is grey and much cracked upon old trees. The *wood* is of a reddish white colour, soft, light, and very sparingly impregnated with resin; it soon decays, and burns badly. It is so little esteemed, that as long as any other kind of wood is to be had, not the least use is made of it. When swamps are dried up and prepared for cultivation, all the trees of this kind growing in them are consumed on the spot. The *leaves* stand closest towards the terminations of the branches, they are from eight to twelve inches long, slender, and of a light green.

The habit of this tree being very singular and curious, and so different from any of its congeners, it forms an interesting appearance, and ought to be planted in every arboretum; but, as it is one of the most tender of the genus, it should be well sheltered from the cold, until it is become of a large size; owing to this neglect, almost all the trees which have been planted in this country have been lost, and I know of only two of any size remaining, one at the Royal Gardens at Kew, the other at the Earl of Coventry's.

EXPLANATION OF TAB. 24 & 25.

- a, a. Anthera, magnified.
- b, b. Points of leaves, magnified.
- c. Ripe Cone.
- d. Scale
- e. Seed.



Warner sculp

Pinus longifolia

24. PINUS LONGIFOLIA.

LONG-LEAVED INDIAN PINE.

PINUS LONGIFOLIA, foliis ternis tenuissimis longissimis pendulis: vaginâ elongatâ, strobilis ovato-oblongis: squamis apice elevatis crassissimis recurvis.

Pinus longifolia. Roxb. MSS. 1180.

Habitat in Nepaliæ montibus.

DESCRIPTIO.

Arbor vasta, excelsa. *Folia* demùm pendula, ultrâ pedalia, gracillima, subtùs striata, convexa, suprâ canaliculata, nervo tenui, prominulo, margine undique serrulato-scabra. *Vaginæ* semunciales, vel paulò longiores, læves, apice laceræ. *Stipulæ* breves, integerrimæ, recurvæ, deciduæ. *Amenta mascula* ovato-cylindræcea, duplò quàm in præcedente breviora; *feminea* globosa, pedunculata, erecta. *Anthearum crista* priori similis sed latior. *Strobili* ovato-oblongi, tuberculati, 5-7-unciales: *squamis* apice maximè elevatis, crassissimis obtusis, recurvis.

For the following account of this tree, I am obliged to a manuscript communication of Dr. Roxburgh's.

“*Leaves* threefold, filiform, very long and pendulous, with margins a little scabrous. *Cones* ovate, considerably shorter than the leaves, *scales* thereof smooth, *anthers* crowned.

“In gardens about Calcutta a few small trees of this species are found, all from Napaul, or reared from seed from that country, where they are found on the stupendous mountains, there growing to an immense size, and there they blossom about the beginning of the hot season. *P. Tæda*, with its varieties, and *P. palustris*, or Swamp Pine of America, are the only other species with threefold leaves; but as I am not in possession of any figure thereof, I cannot take upon me to say this is not one of them; however, it is not likely that the Swamp Pine of America should be found an Alpine plant in Asia; besides, their cones differ in shape; the great length and disposition of the leaves, as well as the structure of the scales of the cone, preclude the chance of its being *P. palustris*, or *P. Tæda*, or any one of its (supposed) varieties.

" *Trunk*. I have observed above, that the trees about Calcutta are small, but in Napaul, I am informed, they grow straight to a very great height, upwards of an hundred feet; the bark is scabrous, the branches verticilled, and rather few in number than otherwise, so that here the head is thin, of a roundish form, and yields little shade.

" *Leaves* threefold, disposed in approximated spiral rows round the ends of the branchlets, perfectly filiform, margin somewhat hispid when the finger is pulled backward, generally pendulous, and from nine to eighteen inches or more in length.

" *Stipules*, or Sheaths round the base of the leaves numerous and chaffy.

MALE FLOWERS.

" *Antheral racemes* numerous at the extremities of the branchlets; from their centre issues the shoot of the same season.

" *Bracts* solitary, one to each raceme.

" *Calix* of the raceme, scales numerous, round, its base chaffy, brown.

" *Stamens* very numerous. *Filaments* scarce any. *Anthers* clavate, opening on each side and crowned with a large roundish scale inflected over the next above."

The cone d. d., with its dissections, are given from authentic specimens brought home by Dr. Roxburgh, from whom also I received the branch with male flowers figured in the plates.

EXPLANATION OF TAB. 26 & 27.

- a. Male Catkin.
- b. Antheræ, magnified.
- c. Young Cone.
- d, d. Ripe Cone.
- e. Seale of the Cone.
- f. Seed.
- g. Sheath of the Leaves.
- h. Point of a Leaf, magnified.



Pinus Canariensis.

25. PINUS CANARIENSIS.

CANARY PINE.

PINUS CANARIENSIS, foliis ternis prælongis patentissimis scabris, antherarum cristâ rotundâ integrâ, strobilis oblongis tuberculatis.

Pinus Canariensis. C. Smith apud Buch. *Fl. Can.* p. 32. et 34. sine descr.
De Cand. *Pl. Rar. du Jard. de Genève*, 1. p. 1. t. 1 et 2.

Habitat in Teneriffæ et Magnæ Canariæ montosis.

DESCRIPTIO.

Arbor magna. Ramuli squamis stipularibus confertis lanceolatis acuminatis filamentoso-ciliatis revolutis basi callosâ rigidâ squarrosi. Folia trina, recurvato-patentia, plerumque pendula, prælonga, tenuissima, undulata, parum tortuosa, compressa, apice calloso-mucronata suprâ bicanaliculata, angulo intermedio elevato cum marginibus serrulatis, scabris, subtus convexa, lævissima, nitida, lineis punctatis parallelis notata, gramineo-viridia, spithamæa v. pedalia: vaginis cylindricis, apice laxis, laceris, semuncialibus. Amenta mascula plurima, aggregata, verticillata, cylindræa, obtusa, pollicaria. Antherarum cristâ rotundâ, membranacæ, integrâ. Strobili ovato-oblongi, tuberculati, 4-6-unciales, diametro ad basin bi-pollicares: squamis crassis, ligneis, apice dilatatis, depresso-quadrangulis, truncatis. Semina oblonga, atrofusca: alâ membranacæ, striatâ, obliquè truncatâ, fuscâ.

THIS tree has been long ago noticed by travellers who have visited Teneriffe; some having confounded it with *Pinus maritima* and *Tæda*, while others have taken it even for *Pinus Larix*; and it was not until that accurate and zealous botanist, Professor Smith of Christiania, visited the island, that its distinctions were ascertained, and its title to rank as a species fully established, under the name which we have adopted. It is also found on the island of Grand Canary, where it still forms pretty extensive forests.

Pinus Canariensis forms a tree of considerable size, the trunk being frequently two feet in diameter; its wood is very resinous, and is admirably adapted for constructions of every description, in which it is universally used by the inhabitants. From its resinous nature the wood is not liable to be attacked by insects, and in favourable situations will endure for cen-

turies. By the Guanches, the aboriginal natives of these islands, the wood was used for torches, to which purpose it is still sometimes applied.

According to M. von Buch, *Pinus Canariensis* extends from the sea coast to the elevation of 6700 feet; but that the region where they are most abundant, and which may be denominated the region of Pines, is between 4080 to 5900 feet above the level of the sea.

Some years ago I raised at Boyton several plants of the Canary Pine, from seeds given me by Professor Smith. The young plants were retained in the greenhouse until they reached the height of ten feet, when they were planted out in the open ground, but were unfortunately destroyed by the cold of the following winter, so that even in the most sheltered situations, I fear it will hardly endure our winters in the open air. It is closely allied to *Pinus longifolia* of Dr. Roxburgh, from which it chiefly differs in the much more depressed, and perfectly straight, tubercles of its cones. That two species so intimately related, in habit and characters, should yet be found so far apart, is a remarkable and interesting fact in the geography of plants.

I am indebted to my highly valued friend, Captain Phillip Parker King, of the Royal Navy, for magnificent specimens of this Pine, collected by himself at Teneriffe, on his voyage to South America, and from these our figure was taken.

EXPLANATION OF TAB. 28.

- a. Leaves with their Sheath.
- b. Ripe Cone.
- c. Scale of the Cone.
- d. Seed.
- e. Point of a leaf, magnified.



Pinus Sinensis.

TAB. 29.

26. PINUS SINENSIS.

CHINESE PINE.

PINUS SINENSIS, foliis geminis tenuissimis, amentis masculis brevibus, strobilis ovatis: squamis apice truncatis muticis.

Habitat in Chinâ.

DESCRIPTIO.

Arbor magna. Rami tuberculati. Ramuli squamis stipularibus squarrosi. Folia gemina, tenuissima, patula, semicylindracea, mucronata, serrulata, gramineo-viridia, 5-pollicaria. Vaginæ cylindricæ, semunciales. Amenta mascula plura, subverticillata, semipollicaria. Strobili brevissimè pedunculati, ovati, brunnei, biunciales: squamis crassis, ligneis, apice tetragonis, dilatatis, truncatis, muticis.

ALL our knowledge of this species is derived from a Chinese drawing in the possession of the Horticultural Society, from which our figure was taken. The tree is frequently represented in Chinese paintings, and as it appears to constitute a very distinct species, we have thought that the figure and the above account, imperfect as they are, were deserving of a place in the present work. It bears considerable resemblance to *P. Laricio*, but the much shorter catkins, and the flat *apices* of the scales of the cones, are characters sufficient to separate them, although we have no doubt that when an opportunity occurs of accurately comparing specimens of both species, many other distinctions equally important will present themselves; and as plants of it have been raised at Dropmore, Messrs. Loddiges, and in other collections, from seeds imported from China, we may confidently look forward to an opportunity of comparing them in a living state.

EXPLANATION OF TAB. 29.

- a. Leaves.
- b. Ripe Cone.

TAB. 30 & 31.

27. PINUS CEMBRA.

SIBERIAN STONE PINE.

PINUS CEMBRA, foliis quinis, strobilis ovatis, seminum alis oblitteratis, antherarum cristâ reniformi crenatâ.

P. Cembra, foliis quinis, comis ovatis obtusis, squamis adpressis, nucibus duris. *Soland. MSS. Ait. Kew. v. 3. 369. Willden. Berl. Baumz. 212.*

P. Cembra, foliis quinis lævibus. *Linn. Sp. Pl. 1419. Syst. ed. Reich. v. 4. 173. Fl. Scan. 32. Mill. Dict. n. 6. Scop. Ann. 2. 65. Evel. Sylv. ed. Hunter. 265. Pall. Fl. Ross. v. 1. 3. t. 2. Allion. Fl. Ped. v. 2, 179. Vitm. Sp. Pl. v. 5. 344. Villars. Dauph. v. 3. 806.*

P. foliis quinis, cono erecto, nuce eduli. Gmel. Sib. v. 1. 179. t. 39. Duhamel. Arb. v. 2. 127. n. 20. t. 32.

P. foliis quinis triquetris. Hall. Helv. n. 1659.

P. foliis quinis, conis ovatis erectis, squamis ovalibus concavis, nucibus cuneiformibus, alâ membranaceâ destitutis. Du Roi. Harbk. ed. Pott. v. 2. 69.

P. sativa, cortice fisso, foliis setosis, subrigidis, ab unâ vaginâ quinis. Amm. Ruth. 178.

P. sylvestris montana tertia. Bauh. Pin. 491.

P. sylvestris Cembro. Cam. Epit. 42.

Larix sempervirens, foliis quinis, nucleis edulibus. Breyn. in Act. Nat. Cur. Cent. 7. 8. Obs. 2. t. 1. f. 3, 4, 5.

Die Cedernfichte. Linn. Pfl. Syst. v. 2. 353.

Habitat in alpihus Sibiriae, Tatariae, Helvetiae, Vallesiae, Baldi, Allobrogum, Tirolensium, Tridentinorum.

Floret Maio.

DESCRIPTIO.

Arbor erecta, robusta, tardè crescens. Folia sæpiùs quinata, quandoque quaterna vel sena, patentia, plerumque triuncialia vel paulò longiora, subtùs planiuscula, suprâ nervo maximè elevato notata, margine scabriuscula. Vaginæ nullæ. Stipulæ lanceolatæ, acuminatæ, persis-



Pinus Cembra

tentes. *Amenta mascula* elliptica, pulcherrimè violacea; antherarum crista reniformis, dentato-erosa, antherâ angustior: *femineâ* elliptico-globosa, erecta, subsessilia. *Strobili* ovati, cernui, læves; juniores violacei cum rore glauco.

P. Cembra, Duhamel informs us, flourishes in the coldest parts of France, where it is called *Alvies*; but it is most abundant on the Swiss Alps, in spots covered with snow, and where no other vegetation flourishes. In Siberia, it seems to be most luxuriant in similar situations, but even marshy spots are not unsuitable to it, as we find from Gmelin, who pronounces this tree, "*frigoris patientissima, et locorum palustrium amantissima*." From these facts we may infer that it may be planted on our bleak and mountainous lands, and if these should be situated in the vicinity of the sea; that circumstance may not be detrimental to its growth. When young, and in warm weather, it will bear being transplanted. See Hart's Essays on Husbandry.

The timber of *P. Cembra* is large, and has a finer grain than common deal; its smell is remarkably pleasant. The bark of the trunk is of a whitish cast. The leaves are of a lighter green than most of the other species, and they closely ornament the branches all round. They are from three to four and a half inches long; the number that springs from one sheath, is five. The flowers have a more beautiful appearance than in any other species, being of a bright purple colour, as are also the unripe; full-grown cones, which have a bloom upon them resembling that of a ripe Orleans plum. The cones are usually almost two inches in diameter, their length is in general not more than three, and the scales are of an oval form often reflexed at the margins. The nuts are triangular, and easily cracked, especially when ripe. The kernels are about the size of a common Pea, and have the whiteness and softness (when stripped of their brownish rind), of a blanchéd Almond. They have an agreeable oily taste, and often form part of a Swiss as well as of a Siberian desert; in the latter country, during a favourable season, such quantities are produced, that the poorest peasants may provide themselves with many pounds at a trifling expense.

In the plantations of Jeremiah Dixon, Esq. near Leeds, may be seen several Pines of this species, which in that neighbourhood is generally denominated the *Gleddow Pine*, from the place where it is cultivated. On Lord Clive's estate also, in Shropshire, there are very flourishing plantations of it; the seeds of these last were brought from Switzerland by Mr. Hyams, who kept the Florida Gardens some time ago, and who, after having supplied a few of the nurserymen with plants, sold the remainder of his stock (amounting to more than two thousand) to the above-mentioned nobleman. They are become a great ornament to the vicinity of Walcot.

P. Cembra is one of the handsomest trees of the whole genus, but of the slowest growth, as may be seen from those at Mill Hill, the two largest of

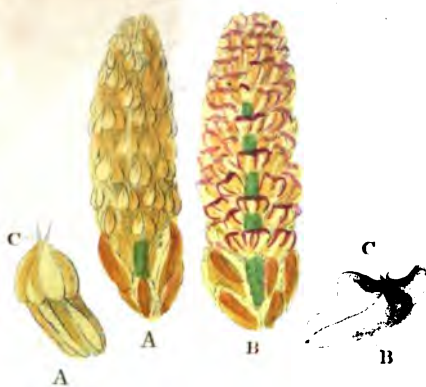


Pinus Cembra?



Feet of Bower & Co.

Pinus



W. Kuhn

Werner, G.

28. PINUS STROBUS.

WEYMOUTH PINE.

PINUS STROBUS, foliis quinis, strobilis folio longioribus cylindraceis lævigatis, antherarum cristâ geminâ subulatâ minimâ.

P. Strobis, foliis quinis, conis cylindraceis, folio longioribus, laxis. *Soland MSS. Ait. Kew. v. 3. 369.*

P. Strobis, foliis quinis margine scabris, cortice lævi. *Linn. Sp. Pl. 1419. Syst. ed. Reich. v. 4. 174. Mill. Dict. n. 13. Evel. Syl. ed. Hunter. 263. Wangenh. Beyt. 1. t. 1. f. 1, Vitm. Sp. Pl. v. 5. 345.*

P. Strobis, foliis quinis, conis oblongis pendulis, squamis ovalibus planis laxis. *Du Roi. Harbk. ed. Pott. v. 2. 78.*

P. Strobis. Marsh. Arb. Amer. 101.

P. foliis quinis, cortice glabro. Gron. Virg. 2. 152.

P. foliis longissimis, ex unâ thecâ quinis. Colden. Novebor. 229. in Act. Soc. Reg. Sc. Ups. 1743.

P. canadensis quinquefolia, floribus albis, conis oblongis et pendulis, squamis abieti ferè similis. Duham. Arb. v. 2. 127. n. 19.

P. virginiana, conis longis, non ut in vulgari, echinatis. Pluk. Alm. 297.

Larix canadensis, longissimo folio. Tournef. Inst. 586.

Die Tannen fichte. Linn. Pfl. Syst. v. 2. 355.

Habitat in Americâ Septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor excelsa, recta, cortice lævi, cinereo, ætate resinoso. *Folia* quinata, patula, triuncialia, gracilia, subtùs carinato-triquetra, margine scabra. *Vaginæ, Stipulæque* nullæ. *Amenta mascula* elliptica, brevia, pallidè purpurascentia; antherarum crista omnium minima, è setis duabus erectis, brevissimis: *faminea* ovato-cylindracea, erecta, brevius pedunculata. *Strobili* penduli, cylindracei, incurvati, læves atque glaberrimi.

“*Cotyledones* 6 ad 10. *Folia* quina, molliora, triquetra, scabra, angulis inconspicuè serratis. *Strobili* spithamæi, apice squamarum crassiore; hæc conjungit Pinum & Abietem Auctorum.” *Reich.*

THE specimen here figured was taken from a tree growing in the Royal Garden at Kew. Of all the species of *Pinus* hitherto known, the Weymouth Pine grows the highest, the straightest, and strongest, and may justly be considered as the chief of this numerous tribe. It inhabits in most perfection the extensive territory comprehended between the forty-second and forty-fifth degree of north latitude. Within this space lie large portions of the provinces of New York, New England, Nova Scotia, and Canada. The principal woods are on the shores of Fundy Bay and of Casco Bay (in Nova Scotia) on the eastern side of Massachuset Bay; on the shores of the rivers Piskatoqua and Merrimach, (in New Hampshire,) and of the Connecticut, and Mohawk; and from the extreme northern side of the river St. Lawrence towards Montreal, and the shores of the Lake Champlain. In the more southerly parts of North America, this species appears but sparingly (as Wangenheim informs us) and never in continued forests; a proof that a cold, rough climate suits it best. The soil in which this pine is found, is said to be of the best kind, being a clay mixed with sand and other earths; it is light and moist, preserving these qualities to the depth of some feet.

The vallies, the crevices of the mountains, and banks of rivers, are the conservatories, as it were, to which the rains and melted snows in the spring carry down the fattest parts of the soil of the higher lands. In these spots, which are sometimes pretty elevated, the natural plantations of *P. Strobis* are seen growing to a height and thickness, not exceeded by any other of the tribe; indeed, few come near to it in these particulars. It is certain that among the full-grown trees, on the best ground, there are some two hundred feet in height, and four or five in diameter at the lower end of the trunk. Wangenheim tells us that he was convinced of the truth of this statement when he was in the dock-yards of Plymouth. "We saw," says he, "two masts for seventy-four gun ships, which measured in the whole piece one hundred and eight feet in length, and a roller that was every where three feet in diameter. Such a tree must have been two hundred feet long, and five feet or more in diameter." (*Beyt. p. 2.*) The growth of this tree, as we are informed by the same intelligent author, is very uniform in its native forests, wherever it is surrounded with others. It naturally prunes itself, the branches falling off of their own accord. When the young tree stands free, and exposed on open spots, the branches are very extensive, and the planks cut from such have no knots. But when several are growing close together, they attain their full size in sixty years, whereas the same height in *P. Picea* usually requires one hundred years. Under these circumstances, in advanced years, *P. Strobis* has a very small top, in proportion to its height and thickness, composed of long twigs, which do not break under the pressure of the heaviest snow, a pressure that would otherwise greatly impede the growth of the tree. The bark, at first, is pretty smooth and of a dark grey colour; but in old trees, it be-

comes somewhat brown and abundantly impregnated with a whitish resin, which has a very agreeable odour. The *wood* is of a yellowish white colour, of a tolerable hardness, very fine, almost resembling the white cedar, and works straight, smooth, and shining. It contains many volatile resinous particles, which contribute greatly to its preservation. The *leaves* are almost three inches long, and grow five in a sheath. They are of a bright green colour, triangular, and very finely serrated. The *flowers* appear at the end of April. The *cones* are from six to eight inches long, and nearly one inch in diameter. Every one of them has a short foot-stalk, and two or three generally shoot round the same branch. Before the cones open, the *scales* lie loosely upon one another. The latter are round, smooth, and when ripe, of a brownish copper colour; at a distance they assume a whitish cast, occasioned by the sun melting a kind of turpentine which oozes from the unripe scales, and makes them clammy. The *seeds* have uniform wings, and are glued, as it were, to the scales by the resinous exudation. When the seed flies out, the wings are generally broken by the wind, so that it is not usually carried far from the tree. It ripens towards the end of August, and, if there happen to be hot days about the middle of September, it will be shaken out.

When there is an intention to rear considerable plantations of *P. Strobus*, good seed should be carefully chosen, and a soil prepared neither too rich nor heavy, and mixed with sand. As to transplanting, every able nurseryman will allow that it impedes the natural growth; he will have remarked also that plants set at a distance from one another grow more to twigs, prune themselves later, and therefore in an equal number of years, rise to less height than if they had been planted close together. Experience shews that the English climate is suited to the growth of this tree; the situation however is a matter of much importance; cold and mountainous spots are certainly the most desirable, and yet they should be such as are protected against violent tempests; for instance, crevices and recesses of mountains, for when too much exposed it is very liable to be injured by the cold winds. The soil in which the seed is to be sown in the spring, should be turned up, and, if possible, the clods broken shortly before the preceding winter. The end of March, or the beginning of April, seems to be the proper period for sowing, and the seed should not be covered over. If sown in the Autumn, it will be necessary to turn up the ground immediately before. With respect to cutting, this should take place when the trees have acquired their full height and strength, and the spots which are cleared may be sown with seed of home produce. Besides furnishing timber for all sorts of masts and yards, and for a considerable part of the hull of a ship, as far as planking is required, this pine is of the greatest use to the common carpenter, who can turn almost every part of it to account. The North American has discovered its value, though hitherto but little skilled in forest botany, and studiously preserves the young trees

from the depredations of cattle. The wood lasts as long above ground as that of any known species of *Pinus*, but in building under ground, for door thresholds, and for the hulls of ships, it should be used only in cases of necessity, as its duration in such situations is rather short, and there are other woods better adapted to such purposes. It yields a very fine resin, from which good turpentine may be prepared. The earliest propagation of *P. Strobus* in this country was at Lord Weymouth's (from which it had its name) in Wiltshire, and at Sir Wyndham Knatchbull's in Kent. Most of the seeds, afterwards sown, were procured from these places, so that our island may be said to have been stocked from them.

Although none of the Pines (except the Larch tribe) are deciduous, yet the position of the leaves becomes very different in Winter, from what they are in Summer; in the latter they are much more divaricated, in the former they become nearly parallel to the stem. (*Folia adpressa, et folia divaricata.*) In no species of Pine is it more exemplified than in this.

EXPLANATION OF TAB. 32.

- a, a. Unripe male Catkin with an unopened Anthera, magnified.
- b. b. Ripe male Catkin, and Anthera which has shed its pollen, ditto.
- c. c. Crest, magnified.
- d, Female Catkin.
- d. Ditto, magnified.
- e. Scales of the same, magnified.
- f. Upper Scale separate; magnified.
- g. Under Scale, magnified.
- h. Ripe Cone.
- i, i. Scales of the same.
- k. Seed with its wing.
- l. Seed stripped of its wing.
- m. Leaves, with their sheath.



Pinus erecta.

29. PINUS EXCELSA.

BHOTAN PINE.

PINUS EXCELSA, foliis quinis praelongis tenuissimis laxis, antherarum cristâ subrotundâ simplici truncatâ laceratâ, strobilis cylindraceis lævibus pendulis foliis longioribus.

Pinus excelsa. *Wallich in litt.*

Habitat in Nepaliâ ad Narainhetty (*Buchanan*), in Bhotaniâ (*W. S. Webb*), in Nepaliæ alpibus. *Wallich.*

DESCRIPTIO.

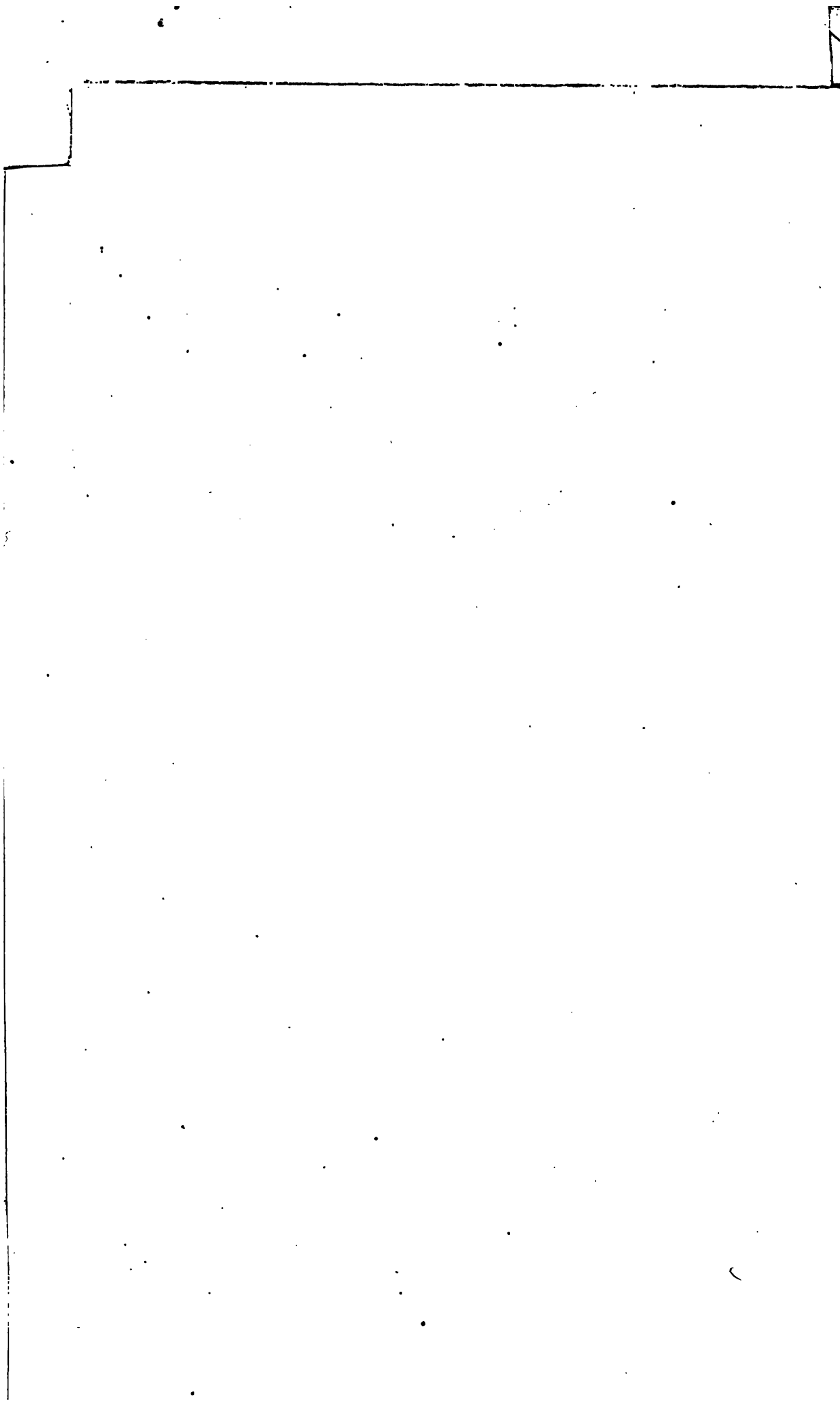
Arbor excelsa, formosa, pyramidata, 90 ad usque 120 pedes attingens. Rami numerosi, assurgentes, divisi, in verticillis ad nodos dispositi. Cortex integerrimus, lævis, mollis, plumbeo-cinereus. Lignum album, turgidum resinâ terebinthaceâ limpidâ. Folia quina, praelonga, tenuissima, triquetra, laxa, glauco-viridia, lenta, 5 v. 7 pollices longa, angulis denticulis remotis exasperata, apice mucronulo calloso instructa, ad ramulos undique conferta atque versus apices ramulorum comosopenicillata, suprâ bicanaliculata, subtùs plana. Vaginæ vix semunciales, caducæ, squamis numerosis lineari-oblongis fulvis membranaceis imbricatæ. Amenta terminalia, basi squamis pluribus membranaceis fuscis suffulta; mascula ovata, brevia, obtusa, sessilia, densa, in capite glomerata, 3 lineas longa, et unam crassa: staminibus monadelphis: antheris brevissimis, subrotundis, bilocularibus, infernè rimâ longitudinali dehiscentibus, polline sulphureo turgidis, apice auctis cristâ parvâ subrotundâ simplici membranaceâ rufo-fuscâ, margine fimbriato-lacerâ; feminea oblonga, cylindracea, terna v. quaterna, erecta, pedunculata: squamis latè rotundatis, introrsum imbricatis, coriaceis, crassis, marginatis, lævibus. Strobili 3 v. 4, cylindracei, pedunculati, nudi, lævigati, 6½-pollicares, ad maturitatem penduli, diametro 2-unciales, versus apicem subattenuati: squamis latissimis, cuneatis, coriaceis, crassis, adpressè imbricatis, lævissimis, luteo-fuscis, superne mucrone brevi crasso obtuso atrofusco apiculatis. Semina ovoidea, ancipiti-compressa: testa ossea, nigrescens, maculis cinereis notata: ala oblonga, obtusa, membranacea, ferruginea, subacinaciformis, reticulata.

THIS species approaches so near in habit and in the figure of its cones to *Pinus Strobis*, that were it not for the simple round membranous crest of the anthers, it would be almost impossible to distinguish them. The leaves are considerably longer than those of the *P. Strobis*, and the cones larger.

I have been fortunate in raising many young plants of this fine species, which, however, are still so small, that I have not yet ventured to put them out in the open ground; but I have little doubt, considering the great elevation at which it is found, but that it will prove equally hardy with the Weymouth Pine. This Pine is frequent both in Upper Nepal and Bhotan; in the former country it was first gathered in the year 1802, by Dr. Francis Hamilton, near Narainhetty, and it is noticed in his "Account of Nepal," under the name of *Pinus Strobis*, from which he did not venture to separate it. I am indebted to my excellent friend, Dr. Wallich, for numerous fine specimens of it in various states. He informs me that in Nepal it is known by the names of *Deeoshera*; *Deoologhosee*, or *Dhoop*, words belonging to the Newarree and Parbuttee languages. I shall conclude this article by adding the following interesting extract from Captain W. S. Webb's letters: "*Lemshing* in the Bhotea, *Raesula* (or King of Firs) in the Hindustanee language. This large tree is found in most parts of Bhotan; and its timber is preferred above all the rest by the Bhotas. The cone in an incipient state is erect, but as it approaches to maturity, it declines, and ultimately becomes pendulous, before its scales open. It yields in great quantities a pure and limpid turpentine, by the slightest incision; and appears to me to merit the title of pre-eminence, which has been conferred upon it, in every respect."

EXPLANATION OF TAB. 33.

- a. Cone-bearing branch.
- b. Branch with the Male Catkins.
- c. Portions of the Leaves, magnified.
- d. Scale of the Cone, shewing the Seeds.
- e. Male Catkin.
- e. Male Catkin, magnified.
- f. Anther.



b

Pinus Lambertiana.



TAB. 34.

30. PINUS LAMBERTIANA.

GIGANTIC PINE.

PINUS LAMBERTIANA, foliis quinis rigidis scabriusculis, vaginis brevissimis, strobilis crassis longissimis cylindricis: squamis laxis rotundatis. *Douglas in Linn. Trans.* 16. p. 500:

OF this highly interesting species, I subjoin the following account by its indefatigable discoverer, Mr. Douglas, and inserted in the sixteenth volume of the Linnean Transactions.

“ This plant covers large districts about a hundred miles from the ocean, in latitude 43° North, and extends as far to the South as 40°. It first came under my notice in August 1825, while at the headwaters of the Multnomah River. In October 1826, it was my good fortune to meet with it beyond a range of mountains running in a south-western direction from the Rocky Mountains towards the sea, and terminating at Cape Orford of Vancouver. It grows sparingly upon low hills, and the undulating country east of the range of mountains just mentioned, where the soil consists entirely of pure sand, in appearance incapable of supporting vegetation. Here it attains its greatest size, and perfects its fruit in most abundance.

“ The trees do not form dense forests as most of the other Pines which clothe the face of North-west America, but like *Pinus resinosa*, which grows among them, they are scattered singly over the plains, and may be considered to form a sort of connecting link between the gloomy forests of the north and the more tropical-like verdure of California.

“ The trunk grows from one hundred and fifty to above two hundred feet in height, varying from twenty to near sixty feet in circumference. One specimen, which had been blown down by the wind,—and this was certainly not the largest which I saw,—was of the following dimensions.—Its entire length was two hundred and fifteen feet; its circumference three feet from the ground was fifty-seven feet nine inches; and at one hundred and thirty-four feet from the ground, seventeen feet five inches. The trunk is unusually straight, and destitute of branches about two-thirds of the height; the bark is uncommonly smooth for such large timber, of a light-brown colour on the south, and bleached on the north side. The branches are rather pendulous, and form an open pyramidal head, with that appearance which is peculiar to the *Abies* tribe. The leaves are between

four and five inches long, and grow in fives, with a short sheath like those of *Pinus Strobis*; they are rigid, of a bright-green colour, but not glossy, and from minute denticulations of the margin are scabrous to the touch. The cones are pendulous from the extremities of the branches; they are two years in acquiring their full growth, are at first upright, and do not begin to droop I believe till the second year: when young they have a very taper figure; when ripe they are about eleven inches in circumference at the thickest part, and vary from twelve to sixteen inches in length. The scales are lax, rounded at the apex, and perfectly destitute of spines. The seeds are large, eight lines long and four broad, oval; and, like that of *Pinus Pinea*, their kernel is sweet and very pleasant to the taste. The wing is membranous, of a dolabriform figure and fuliginous colour, about twice as long as the seed; it has an innumerable quantity of minute sinuous vessels filled with a crimson substance, and forming a most beautiful microscopic object. The embryo has twelve or thirteen cotyledons.

“The whole tree produces an abundance of pure amber-coloured resin. Its timber is white, soft, and light: it abounds in turpentine reservoirs, and its specific gravity has been ascertained from a specimen brought home by me, to be 0.464. The annual layers are very narrow; in the above specimen there were fifty-six in the space of four inches and a half next the outside. The resin, which exudes from the trees when they are partly burned, loses its usual flavour, and acquires a sweet taste, in which state it is used by the natives as sugar, being mixed with their food. The seeds are eaten roasted, or are pounded into coarse cakes for their winter store. I have since my return been informed by Mr. Menzies, that when he was on the coast of California with Captain Vancouver, in 1793, seeds of a large pine, resembling those of the Stone Pine, were served in the dessert by the Spanish priests resident there. These were no doubt the produce of the new species now noticed. The vernacular name of it, in the language of the Umptqua Indians, is *Nát-cleh*.

“The species to which this pine is most nearly allied is undoubtedly *Pinus Strobis*; from which, however, it is extremely different in station, habit, and parts of fructification. I have named it in compliment to Aylmer Bourke Lambert, Esq., a Vice-President of the Linnean Society, whose splendid labours in investigating the genus *Pinus* are too generally known and appreciated to require any eulogium from me.”

I am indebted to the Horticultural Society for the branch and cone represented in the plate, and to the Right Honourable the Countess of Selkirk, for another very perfect cone, of which a figure is also given in the larger work. Many young trees were raised from seeds brought home by Mr. Douglas, and have been liberally distributed to various collections by the Horticultural Society.

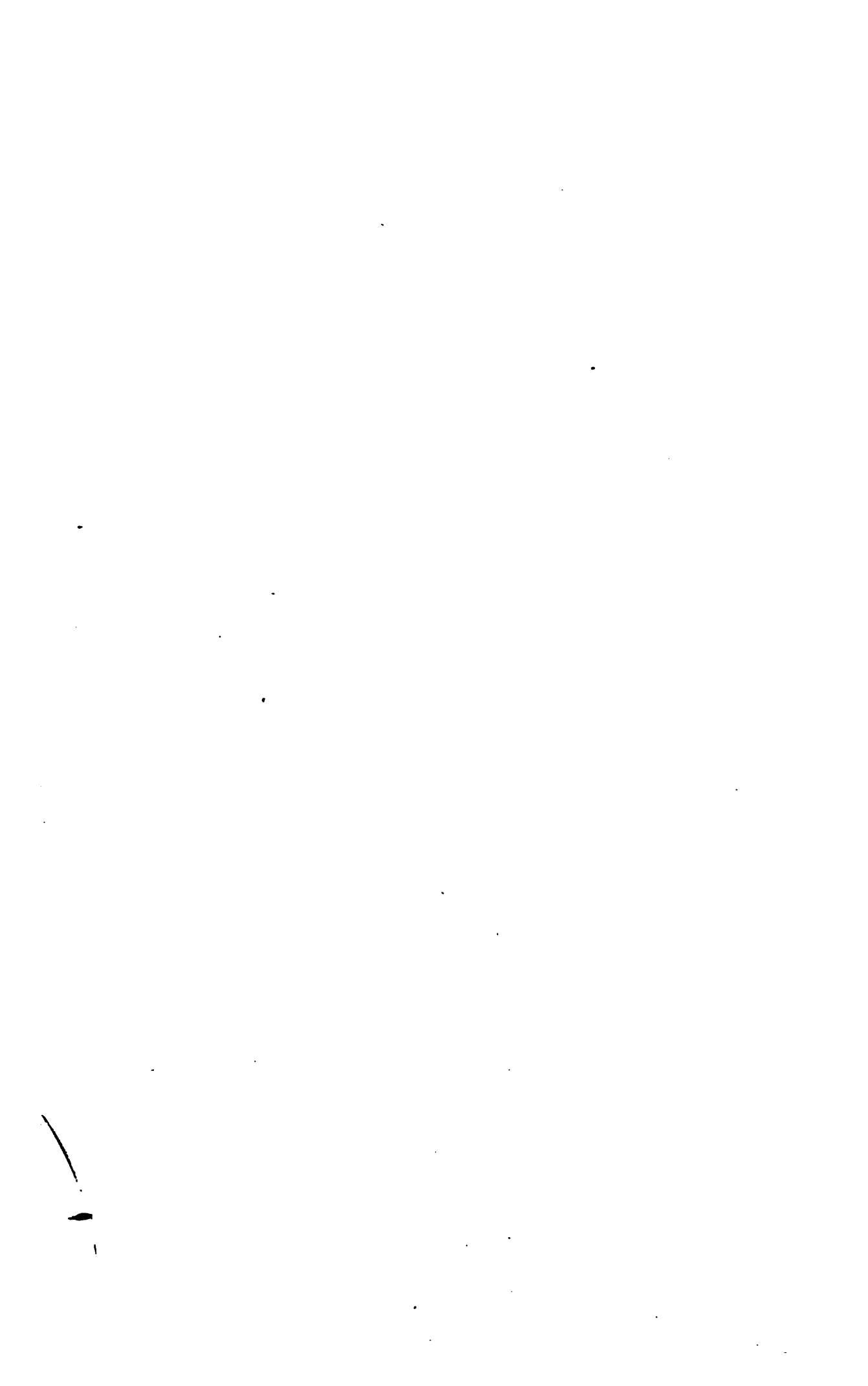
EXPLANATION OF TAB. 34.

a. Leaves. b. Cone. c. Seed.



Pinus Abies.

W. P. W. E.



* * * *Foliis solitariis ramos ambientibus.*

TAB. 35.

31. PINUS ABIES.

NORWAY SPRUCE FIR.

PINUS ABIES, foliis solitariis tetragonis, strobilis cylindraceis: squamis rhombeis complanatis margine repandis erosis.

P. *Abies*, foliis solitariis subtetragonis acutiusculis distichis, ramis infra nudis, conis cylindraceis. *Ait. Kew.* v. 3. 371. *Willden. Berl. Baumz.* 221.

P. *Abies*, foliis solitariis subulatis mucronatis lævibus bifariam versis. *Linn. Sp. Pl.* 1421. *Syst. ed. Reich.* v. 4. 177. *Fl. Suec.* n. 875. *Lapp.* n. 347. *Mat. Med.* n. 473. *Huds. Angl.* 424. *Scop. Carn.* n. 1194. *Gunn. Norv.* n. 39. *Evel. Sylv. ed. Hunter.* 266. *Trew. in Nov. Act. Ac. N. Cur.* v. 3. *App.* 445. t. 14. f. 5. 10. et t. 16. f. 1. 10. *Mattusch. Sil.* n. 705. *Dorr. Ners.* 263. *Blackw. t.* 198. *Fl. Dan. t.* 193. *Regn. Bot. Pall. Fl. Ross.* v. 1. 6. t. 1. f. G. *Allion. Fl. Ped.* v. 2. 180. *Woodv. Med. Bot.* 573. t. 208. *Vitm. Sp. Pl.* v. 5. 346. *Villars. Dauph.* v. 3. 810.

P. foliis solitariis, tetragonis, mucronatis. *Hall. Helv.* n. 1656.

P. *picea*, foliis solitariis subulatis bifariam versis, conis oblongis pendulis, squamis ovalibus planis marginibus undulatis et laceris. *Du Roi. Harbk. ed. Pott.* v. 2. 156.

Abies picea. *Mill. Dict.* n. 2.

A. foliis solitariis apice acuminatis. *Linn. Hort. Cliff.* 449. *Fl. Suec. ed.* 1. 789. *Fl. Lapp. ed.* 1. n. 347. *Dalib. Paris.* 295. *Gmel Sib.* v. 1. 175.

Die Bothtanne. *Linn. Pfl. Syst.* v. 2. 368.

Habitat in Europæ, Asiæ borealibus humidiusculis.

Floret Aprili.

DESCRIPTIO.

Arbor excelsa, recta, pyramidalis, ramis inferioribus deflexis. *Folia* solitaria, undique patula, uncialia, tetragona, obtusiuscula, lævia, nitida. *Stipulæ* nullæ. *Amenta* mascula erecta, brevius pedunculata, ovato-

cylindræa; antherarum crista reniformis, dentato-lacera, antherâ parùm angustior: *feminea* cylindræa, erecta, solitaria, terminalia, sessilia; bracteolæ squamis interstinctæ, minimæ, mucronulatæ. *Strobili* penduli, 4 vel 5 unciales, cylindræci, læves, squamis latè ovalibus, seu rhombiformibus, complanatis, extùs repandis, apice erosis.

P. Abies is one of the loftiest of the European trees, growing sometimes to the height of one hundred and fifty feet. It is commonly straight and pyramidical. The *bark* is reddish and scaly, the *leaves* shoot very thickly, but not so regularly as in *P. Picea*; they are slightly carinated on both sides, of a dusky green colour, shining on the upper surface, and often curved. In summer, after a long continuance of dry weather, I have seen most of them decay and fall off. The *cones* are nearly cylindrical, of a purple colour, and sometimes green before they are ripe, always pendant. The *scales* assume an oval shape, and become somewhat ragged on the edges. The *seeds* are small, rather flattened, and oval, with two thin elliptical membranous wings.

The wood of *P. Abies* is extremely serviceable for a great variety of purposes, being very firm, straight, and regular in the grain, and capable of resisting moisture a long time; that which is grown in England is said to be more durable than what is imported, and to be particularly useful in making of ladders.

From the resin, yielded by this tree, the Burgundy pitch is prepared; an account of which will be found in another part of the work.

The insects commonly inhabiting *P. Abies* are *Phalæna strobilina*, *Chermes Abietis*, and *Cimex abietinus*.

EXPLANATION OF TAB. 35.

Pain's Hill afforded me the specimen for the engraving.

- a. Anthera, magnified.
- b. Female Catkin.
- c. Scale of the ripe Cone.
- d. Seeds.
- e. Leaf, magnified.



Pinus alba.

32. PINUS ALBA.

WHITE SPRUCE FIR.

PINUS ALBA, foliis solitariis tetragonis incurvis, strobilis subcylindræis
laxis: squamis obovatis integerrimis.

P. alba, foliis solitariis tetragonis: lateralibus incurvis, ramis subtus nudiusculis, conis subcylindræis. *Soland. MSS. Ait. Kew. v. 3. 371.*
Willden. Berl. Baumz. 221.

P. luxa, ramulis glaberrimis; phyllophoris elevatis, patentibus; foliis solitariis, sessilibus, subsecundis, tetragonis, obtusiusculis, lineis quatuor longitudinalibus punctatis; strobilis oblongo-ovalibus, pendulis; squamis, obovato-subrotundis, integerrimis, tenuibus, lævigatis. *Ehrh. Beitr. v. 3. 24.*

P. canadensis, foliis solitariis subulatis bifariam versis, ramulis glabris, cicatricibus sub foliis decurrentibus, conis ovato-oblongis pendulis laxis, squamis subrotundis. *Du Roi Harb. 124. Wangenh. Beyt. 5. t. 1. f. 2.*

Abies piceæ foliis brevioribus, conis parvis biuncialibus laxis. *Hort. Angl. 2. t. 1. Duham. Arb. v. 1. 3. n. 8.*

A. canadensis. *Mill. Dict. n. 4.*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor magnitudine et formâ prioris, at cortice albidiore, foliisque magis incurvatis parùmque minoribus. *Amenta mascula* cernua, longius pedunculata, pedunculo gracili; antherarum crista reniformis, dentata, antherâ latior: *fæminea* ovato-cylindræa, erecta; bracteolæ squamis interstinctæ, minimæ, rotundatæ, muticæ. *Strobili* penduli, biunciales, ovato-cylindræi, læves, squamis obovatis, subretusis, integerrimis.

My specimens were procured from the Royal Gardens at Kew. *P. alba* has its name from its bark being whiter than that of other species. It is found in America from the forty-third degree of north latitude northward, but farther southward it disappears, requiring a very cold climate. In

Canada, Nova Scotia, and the northern parts of New England, it grows in perfection, as Wangenheim informs us, and covers the tops of mountains too bleak and of too bad a soil for *P. Strobilus*. The growth of *P. alba* is nearly equal to that of *P. Abies*. It flourishes on poor and rocky land, and also on gravel when dry, and mixed with clay and a little good mould. A soil apparently but just sufficient to hold the roots enables it grow. The flowers appear towards the end of May. The cones ripen at the end of October. These are from two inches and a half to three inches in length, and almost one inch in diameter. The scales are smooth, loose, and contain black winged seeds. The root commonly sends forth horizontal shoots; but sparingly in light ground. Wangenheim particularly recommends the cultivation of the white Spruce, because it becomes a tree of the first magnitude, the timber of which may be very advantageously employed, and because situations which are unfavourable to the progress of many other pines yield this best. It is much to be wished that advice, founded on arguments so rational, may be generally followed. We are to consider also that *P. alba* is one of the most ornamental of the *Abies* tribe. It grows with its branches feathered down to the ground, and the leaves have a peculiar glaucous hue, making a most beautiful appearance, particularly when mixed with other Pines. The seeds might be procured from Nova Scotia or Canada. When exported from thence, they are usually taken out of their cones, with or without their *alæ*, and packed in well-pitched casks. The preparation of the ground intended for the reception of the seed consists merely in digging it up in the preceding autumn. They should be laid on it towards the end of April, without being covered, and pretty thickly, in order that the young plants may not be choaked with weeds when they appear. The attention necessary to the seedling, until it is planted out, is the same as the other species of this genus require.

Though the coldest parts of mountains are best suited to the support of *P. alba*, yet experience shews that there is difficulty in raising trees from the seed, and although they come up, and look well the first year, yet they are often lost in the second or third cold winter. Hence it is much better to plant young trees where you wish to fix the plantations. They may be obtained at a very moderate price in almost any of the nursery gardens about London. As the *Abies* tribe seldom or never grow with tap roots, these are fittest for being transplanted, and the age of four or five years seems to be the most proper period. In situations much exposed to cold winds, they should be placed near to one another. When once the plantations begin to thrive, any open spots in them may be sown with success.

There are many heaths and waste lands in this and in the sister kingdom, which we may hope to see applied to the cultivation of this species. In England, as proofs that Hounslow and Bagshot Heaths are not unsuitable, I need only mention the flourishing plantations of Whitton and its vicinity. In Ireland, I am certain that the high and mountainous heaths which lie

between Westport and the Killeries, and the western parts of the County of Mayo,* might be planted with great advantage; at present they produce little or no profit to their owners.

The bark of *P. alba* is used for tanning; its resin is converted into good turpentine, to which purpose, in those parts of America whence timber cannot be exported, the trees are very generally applied. In Canada, Nova Scotia, and New England, they make another advantage of them, besides using the wood, which is that of preparing *Spruce* or *Essence of Spruce*. This article is exported to the more southern provinces, and to England. The mode of preparing it will be described hereafter.

Some of the finest trees of this species, and the greatest number in any one plantation, that I have ever seen, are at Milton-Abbey in Dorsetshire, the seat of the Earl of Dorchester. There are very flourishing ones also at Pain's Hill.

I have remarked that *P. alba*, when young, and in great vigour, will sometimes bear cones of a very large size, with numerous small *squamæ*, and a branch or shoot growing out of their tops.

There is a fine tree of this species in the beautiful grounds of the Earl of Tankerville at Walton.

EXPLANATION OF TAB. 36.

- a. Male Catkin, magnified.
- b. Anthera, magnified.
- c. Female Catkin.
- d, d. Its Scales.
- e. Ripe Cone.
- f, f. Scales of the same.
- g. Seed.
- h, h. Leaves, their point magnified.

* In this county I have observed extensive remains of *P. sylvestris*; the old roots almost covering the bogs, and so little decayed that the poor people dig them up, in order to convert them into ropes for tying up the bedding, &c. in their cabins. The situation of these cabins being very damp, ropes made with hemp soon decay. I have bought three fir ropes as thick as cart ropes, and some yards long, in Castlebar market, for sixpence each. The wood is daily cried for sale in the streets of Dublin by the name of Bog Wood.

33. PINUS NIGRA.

BLACK SPRUCE FIR.

PINUS NIGRA, foliis solitariis tetragonis rectis strictis, strobilis ovatis: squamis ellipticis margine undulatis erosis.

P. nigra, foliis solitariis tetragonis undique sparsis rectis strictis, conis oblongis. *Ait. Kew. v. 3. 370. Willden. Berl. Baum. 220.*

P. mariana, ramulis pubescentibus, phyllophoris elevatis, patentibus; foliis solitariis, sessilibus, subsecundis, tetragonis, lineis quatuor longitudinalibus punctatis; strobilis ovatis pendulis; squamis obovatis, crassis, lignosis, rigidis, apice crenulatis, subundulatis. *Ehrh. Beitr. v. 3. 23.*

P. nigra. Du Roi. Harbk. ed. Pott. v. 2. 182.

Abies mariana, foliis linearibus acutis, conis minimis. *Wangenh. Beyt. 75.*

Habitat in Americâ septentrionali.

Floret Maio.

DESCRIPTIO.

Arbor mediocris, erecta, cortice nigricante. *Folia* recta. *Amenta mascula* pedunculata, erecta; antheræ angustatæ, cristâ rotundatâ, ciliato-dentatâ, antheris duplò latiore: *feminea* ovata, erecta, bracteolis exiguis, rotundatis. *Strobili* penduli, ovati, unciales, purpureo-nigricantes, læves, squamis subellipticis, apice dentato-erosis.

P. nigra grows wild only in New England, Canada, Nova Scotia, and the colder climates northward. It generally occupies a cold, moist, sandy soil. Its height in such places is from thirty to forty feet, and its diameter from one to two at about the middle of the trunk, which is uneven, and the branches reach to the ground. The *bark*, both of the trunk and the branches, is blackish, but the wood has a reddish white colour; the latter is light, and full of large veins. In cases of necessity, it is used by the Americans for building fishing-boats, and small vessels. The top of the tree is impregnated with fine resinous particles. It is at its greatest strength in the spring, when an extract is made from the leaves and young shoots, as well as from those of *P. alba*, with which Spruce beer is brewed. Some persons are of opinion that the extract made from the former species, is



Pinus nigra :

better than that made from the latter. The *leaves* are little more than half an inch in length, slender, tetragonal, and of a dark green colour. The *cones* assume an oval shape, but they are small. The *scales* of these are of a coriaceous texture, and large in proportion to the dimensions of the cone. In Canada and Nova Scotia the seed ripens about the end of November, but is not shed before the following spring. This tree is not so much cultivated in this country as it deserves.

The *Pinus Chinensis*, of Professor Pott, (specimens of which he has obligingly presented to me,) appears to be no other than the species here described, which indeed seems to be suspected by the Professor himself, from his having inserted the name of "*P. nigra*?"

Dr. Richardson observes, in App. 7, of Capt. Franklin's Narrative of a Journey to the North Pole, that they found *P. nigra* in swampy situations as far north as lat. 65°, where it terminated, and that the preceding species, *Pinus Alba*, was the most northerly tree that came under their observation. On the Coppermine river, within twenty miles of the Arctic Sea, *P. alba* attained the height of twenty feet or more.

Its timber was in common use throughout the country, and its slender roots, denominated *watapeh*, were indispensable to canoe-makers for sewing the slips of birch-bark together. The resin which it exudes was used for paying over the seams of the canoe, and that canoes for temporary purposes were frequently formed of its own bark.

P. alba was the only tree that the Esquimaux of the Arctic Sea had access to while growing, and they contrived to make pretty strong bows by joining pieces of its wood together.

EXPLANATION OF TAB. 37.

The specimens were procured from Kew gardens.

- a. Male Catkin.
- b, b. Antheræ, magnified.
- c. Female Catkin.
- d, d. Scales.
- e, e. Ripe Cones
- f, f, f. Scales of the same.
- g. Seeds.
- h. Leaf, magnified.

34. PINUS RUBRA.

NEWFOUNDLAND RED PINE.

PINUS RUBRA, foliis solitariis subulatis acuminatis, strobilis oblongis obtusis: squamis rotundatis subbilobis margine integris.

P. Americana rubra, foliis solitariis subulatis, apice acuminatis, bifariam versis, conis ovalibus pendulis. *Wangenh. Beyt.* 75. t. 16. f. 54.
Newfoundland red Spruce Fir. *Du Roi. Harbk. ed. Pott. v. 2.* 182.

Habitat in Americâ septentrionali,
Floret Maio.

DESCRIPTIO.

Præcedente humilior, cortice rubro-fusco. *Folia* acuminata. *Amenta mascula* nondum vidi matura: *feminea* ovata, sessilia. *Strobili* ovato-cylindracei, unciales vel sesquiunciales, penduli, rubicundi, læves, squamis cuneatis, apice rotundatis, demum bilobis, margine integris.

THE specimen represented in the plate was taken from a young tree in the gardens of Messrs. Whately and Barrett, at Brompton, where it was planted by Mr. Thorburn, who took more pains in the cultivating of Pines than any gardener of his time. The two full-grown cones at the bottom of the plate are taken from fine specimens received from America by that able and well-known gardener, Mr. Loddiges, of Hackney.

Wangenheim says, that *P. rubra* grows only in the more northern parts of America, and mostly in Nova Scotia and Newfoundland. It is found in a moist cold soil, and never attains a greater height than thirty feet.

The *bark* is of a brownish red colour, smooth on the younger branches, and rough on the older. It is used for building fishing-boats, &c. &c. The *leaves* are not much more than half an inch in length, awl-shaped, and acute, but otherwise resembling those of the former. These and the young sprouts are used for making spruce beer. It is said that the flowers appear in Nova Scotia towards the end of May. The *seed* is smaller than that of *P. sylvestris*, and ripens in November. It is contained in oval *cones* which are about one inch or more in length, and of a reddish brown



b



b



c



d



d

Pinus rubra

colour. They seem to differ from those of *P. alba*, in being rather thicker, and the scales of firmer texture. The *scales* have all a deep notch, and are longer than those of the preceding species, as well as of a redder colour; which circumstances, added to the more diminutive size of the tree, distinguish *P. rubra* at once, when it is seen growing with *P. nigra*. Resin runs in abundance out of the scales when ripe, and overspreads them with a crust, which nature seems to have given by way of protection against the coldness and humidity of the American winters.

There are a few trees of this species in the nursery at Brompton, but they are too young to produce full-sized cones. I was favoured by Mr. Loddiges of Hackney, with two parcels of cones from America, one under the name of *P. nigra*, and the other under that of *P. rubra*; the former resembling exactly such as are produced by the trees of that species in England; the latter very different, being larger, longer, more obtuse, and of a shining reddish brown colour; the scales semicircular, each divided by a notch in the middle, and with the margins entire.

Although I have made this tree at present a distinct species, I wish to examine all the different parts of fructification, when an opportunity offers.

That remarkable dwarf Fir, which Lord Clanbrassil introduced some years ago into this country, and the parent tree of which is said to grow on the Earl of Moira's estate in Ireland, I should suppose to be a variety of this species.

There is one of these dwarf trees at Spring Grove, the seat of the Right Hon. Sir Joseph Banks, Bart., and another in Mr. Lee's garden at Hammersmith.

EXPLANATION OF TAB. 38.

- a. A Cone of English growth.
- b, b. Ripe Cones imported from America by Mr. Loddiges.
- c, c. Their Scale.
- d, d. Seeds.

35. PINUS ORIENTALIS.

ORIENTAL PINE.

PINUS ORIENTALIS, foliis solitariis tetragonis, strobilis ovato-cylindraceis :
squamis rhombeis.

P. orientalis. *Linn. Sp. Pl.* 1421. *Syst. ed. Reich.* v. 4. 178. *Vitm. Sp.*
Pl. v. 5. 346.

Abies orientalis, folio brevi et tetragono, fructu minimo deorsum inflexo.
Tournef. Cor. 41. *Duhamel. Arb.* v. 1. 4. n. 10.

Ελάρη Græcorum recentiorum. *Tournef.*

Die Morgenländische Tanne. *Linn. Pfl. Syst.* v. 2. 370.

Habitat in Oriente.

DESCRIPTIO.

Folia brevica, recta, mutica. *Strobili* biunciales, ovato-cylindracei, penduli,
squamis cuneato-rhombeis, integris.

I INSERT this species on the authority of Tournefort only, who states, see *Voy. du Levant. tom. 2.* 238, that he found it growing in the vicinity of Trebisonde, where it is known by the name of Ελάρη. Its trunk and branches, he says, are about the size of *P. Picea*. The leaves are but four or five lines in length, and not more than half a line in breadth, their colour a shining greenish brown; the cones are described as being nearly cylindrical, about two inches and a half in length, and eight or nine lines in diameter, pointed, and composed of soft, thin, rounded scales which cover very minute and oily seeds.

I have never seen a specimen of *P. orientalis* either recent or dried, but am inclined to think that some cones brought from China belong to this species. These cones I have figured; and having been fortunate enough to obtain a copy of the drawing of *P. orientalis* made by Aubriet under the eye of Tournefort himself, and which is now in the possession of M. de Jussieu, I am enabled to show exactly what that celebrated traveller described. The copy was made by M. Mareschal, painter to the museum at Paris, whose talents are well known: and it was obligingly communicated to me by that eminent naturalist, M. Latreille.





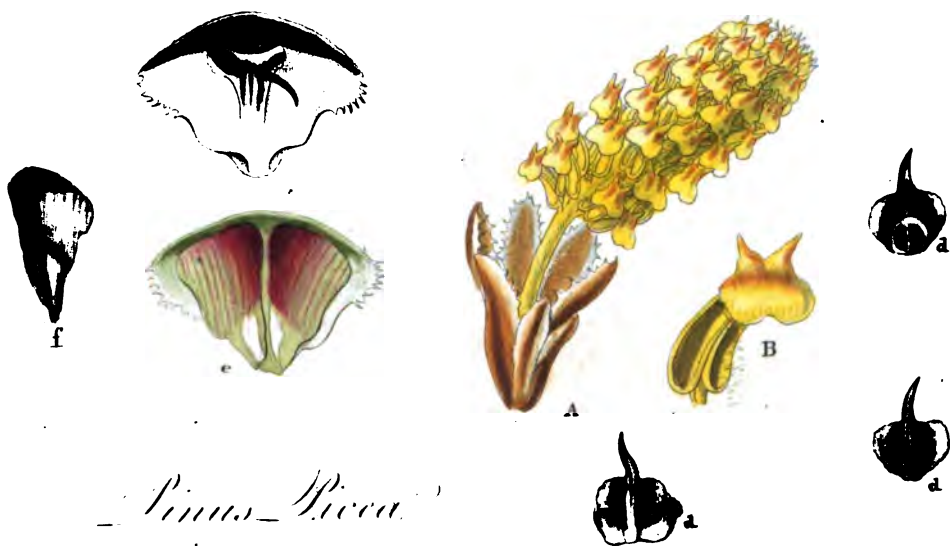
Pinus Orientalis.

ADDITIONAL REMARKS.

From a specimen collected in the vicinity of Teflis, and obligingly communicated to me by Sir Gore Ouseley, I am now enabled to speak decidedly to the specific distinctions of this species. Its short quadrangular leaves closely and imbricately arranged on the branches, and its oblong elliptical cones, which are four times shorter, with rhomboidal entire scales, are characters that abundantly distinguish this interesting, but hitherto little known, species from *P. Abies*. The leaves are twice or thrice shorter than those of the latter, and are distinctly mucronulate, not pointless, as represented in figure a. The scales of the cone finally become emarginate, or slightly crenulate.

EXPLANATION OF TAB. 39.

- a. Figure of *P. orientalis* from the original drawing of Aubriet.
- b, b. Leaves of Sir Gore Ouseley's specimen ; natural size.
- c. One of them magnified.
- d. Section of another leaf, magnified to show the angles.
- e. Cone of the same specimen.
- f. Cone from China, supposed the same species.
- g, g. Scales of the same.
- h. Seeds of ditto.
- i. Part of Sir Gore Ouseley's specimen, from which the leaves had all fallen off.
- j. Scale, with the seeds.
- k, k. Seeds separate.
- l. A seed, with its wing removed.
- m, m. Seeds, magnified.



Pinus pecea

latiores, cristâ infernè reniformi, supernè bicorni, mucronulis divaricatis: *feminea* masculis quintuplò majora, bracteolis obcordatis, mucronatis, squamas longè superantibus. *Strobili* erecti, sessiles, cylindracei, ferè spithamæi, bracteolis persistentibus, porrectis, undique muricati, squamis obtusissimis, apice integerrimis, lateribus dentato-ciliatis.

IN Siberia, where this species is very abundant, it seems to delight in flat aqueous situations, so much so, that a forest of Silver Firs, as Gmelin states, is considered by the Tartar hordes as a sure indication of good springs being at hand. It grows to a considerable height, and upright, and has a handsome appearance. The *bark* is whitish, and smooth. The *wood* is rather soft, and therefore does not last long, if exposed to the open air. The *branches* shoot horizontally, but are not very numerous. Between the midrib and the edges of the latter, there is a beautiful silvery white appearance, whence the name of *Silver Fir*. They are of a fine strong green colour on the upper surface. The ends are slightly indented. The *cones*, which are of an oblong, or almost of a cylindrical shape, stand erect. The *scales* are roundish, broad, and reflexly mucronated. Warm weather soon exposes the *seeds*, which in colour approach the carnation, and in shape are oblong and polygonal. They are wholly covered by the wing on one side, but only half on the other; these wings are obliquely truncated at the top.

The specific name of this tree indicates its yielding Pitch, which is extracted by means of incisions made in the bark, as will be more fully treated of in another place. Haller calls the resin of *P. Picea*, *Terebinthinarum optima*, but the finest turpentine used in our shops seems to be the produce of a very different tree; viz. *Pistachia Terebinthus*.

One of the tallest and finest trees of this species that I have seen, is in the garden of the late John Duke of Argyle, now the property of Mr. Gosling.

EXPLANATION OF TAB. 40.

- a. Male Catkin, magnified.
- b. Anthera, magnified.
- c. Female Catkin.
- d. Scale of the same, with the prominent bracteolæ.
- e, e. Scales of the ripe Cone.
- f. Seed.

37. PINUS BALSAMEA. .

BALM OF GILEAD FIR.

PINUS BALSAMEA, foliis solitariis planis subsecundis, strobilis cylindraceis erectis, bracteolis abbreviatis, antherarum cristâ muticâ.

P. Balsamea, foliis solitariis planis emarginatis subpectinatis supra subrectis, squamis coni florentis acuminatis reflexis. *Soland. MSS. Ait. Kew. v. 3. 370. Willden. Berl. Baumz. 218.*

P. Balsamea, foliis solitariis subemarginatis; subtus lineâ duplici punctatâ. *Linn. Sp. Pl. 1421. Syst. ed. Reich. v. 4. 176. Gron. Virg. 2. 152. Wangenh. Beyt. 40.*

P. foliis solitariis subemarginatis, conis ovato-oblongis erectis, squamis subrotundis planis basi acuminatis. Du Roi. Harbk. ed. Pott. v. 2. 144.

P. Abies balsamea. Marsh. Arb. Am. 102.

Abies balsamea, foliis subtus argenteis apice subemarginatis bifariam versis. *Mill. Dict. n. 3.*

A. taxi folio, fructu rotundiori obtuso. Hort. Angl. 2. 2.

A. taxi folio, odore Balsami Gileadensis. Du Hamel Arb. v. 1. 3. n. 3.

A. minor pectinatis foliis, virginiana, conis parvis subrotundis. Pluk. Alm. 2. t. 121. f. 1.

Die Balsamtanne. Linn. Pfl. Syst. v. 2. 365.

Habitat in Virginia, Canada.

Floret Maio.

DESCRIPTIO.

Forma ferè præcedentis, at *folia* paululùm angustiora, minùsque glauca. *Amenta* ovata: *mascula* semiuncialia, pedunculata; antherarum crista reniformis, apice mutica, vel brevissimè mucronulata, nequaquàm bicornis: *feminea* sesquiuncialia, bracteolis ellipticis, crenulatis, mucronulatis. *Strobili* ovato-cylindracei, violacei, resinosi, fragiles, magnitudine prioris, bracteolis persistentibus, vix squamas excedentibus.

P. Balsamea has its natural abode in the northern provinces of America, but chiefly in Nova Scotia, Canada, the more northern parts of New York and New England. It stands mostly on the colder side of the mountains, in heavy grounds mixed with clay and sand, yet dry and poor.



Pinus Balsamea

Weddell Feat.

In these situations we are informed by Wangenheim it grows to a considerable height and strength, like *P. Picea*. Therefore if some trials of this species in England have failed, the principal cause must be either too great warmth of the spot, or the richness of the soil. I have observed that it bears being transplanted much better than many others of the tribe.

The *bark* is of a whitish grey colour, and in texture pretty smooth.

Between it and the wood are vesicles which contain a resin, like turpentine, that is often sold in the shops under the name of Balm of Gilead, though the latter in its genuine state is the produce exclusively of *Amyris Gileadensis*. The resin of *P. Balsamea* is no other than the common *Canada Balsam*.

The wood of this species is white, and seems to be better suited to ship-building, and other purposes, than that of *P. Picea*. The *leaves* are somewhat smaller than those of the last-mentioned Pine. The *blossoms* appear at the beginning of May, and the seed ripens about the beginning of October. The *cones* are of a most beautiful glossy deep purple colour, inclining to black, and there exudes from them great quantities of a transparent resin, as is represented in the plate, and which has a very rich appearance.]

Some of the largest trees of this species, I am informed, are at Woburn Abbey, the seat of the Duke of Bedford, and at Warwick Castle, the seat of the Earl of Warwick, where they are said to be considerably more than twenty years old, contrary to what was supposed both by Millar and myself, who have observed that they do not last so long in many situations.

It does not thrive well in the neighbourhood of London, not growing to any large size, and soon decaying after it is removed out of the nursery.

My specimens were procured at Longleat, Wilts, the seat of the Marquis of Bath, the only spot where I have seen this tree in perfection.

EXPLANATION OF TAB. 41.

- a. Male Catkin, magnified.
- b. Anthera, magnified.
- c. Female Catkin.
- d, d. Its Scales.
- e, e. Bracteolæ.
- f. Seed.



Pinus Fraxeri.

with *Pinus Pumilio*, is well suited for lawns and pleasure grounds, in such situations where it is wanted to break particular lines, but not to interrupt the view.

There is a fine tree of *Pinus Fraseri* in Mr. Lee's nursery grounds at Hammersmith, which annually bears cones, and from a branch from thence our figure was taken.

EXPLANATION OF TAB. 42.

- a. Scale of the Cone.
- b. Appendage of the Scale.
- c, c. Seeds.
- d. Male Catkin.
- e. Anther, surmounted by its crest.
- f. Leaves, magnified.
- g. Point of a leaf, ditto.

TAB. 43.

39. PINUS RELIGIOSA.

MEXICAN SILVER FIR.

PINUS RELIGIOSA, foliis linearibus acutis integerrimis subpectinatis, strobilis subrotundo-ovalibus: squamis truncatis lamelliformibus, bracteolis brevissimis.

Pinus religiosa. Kunth in *Humb. et Bonpl. Nov. Gen. et Sp. Plant.* 2. p. 5. Schiede et Deppe in *Schlecht. Linnæa*, 5. p. 77.

Habitat in Mexico inter Masatlan et Chilpantzingo, (*Humboldt et Bonpland*) in frigidis Orizabæ montis. *Schiede et Deppe*.

DESCRIPTIO.

Arbor excelsa. Ramuli cortice brunneo. Folia undique inserta, sed disticho modo patentia, subpectinata, linearia, acuta, margine obtuso integerrima, coriacea, glabra, suprâ lineâ depressâ exarata, subtùs in junioribus præsertim subargentea; utrinque demùm concoloria, uncialia. *Strobilus* ferè *Cedri*, subrotundo-ovalis, sesquipollicaris, obtusissimus, fuscus: *squamis* truncatis, lamelliformibus.

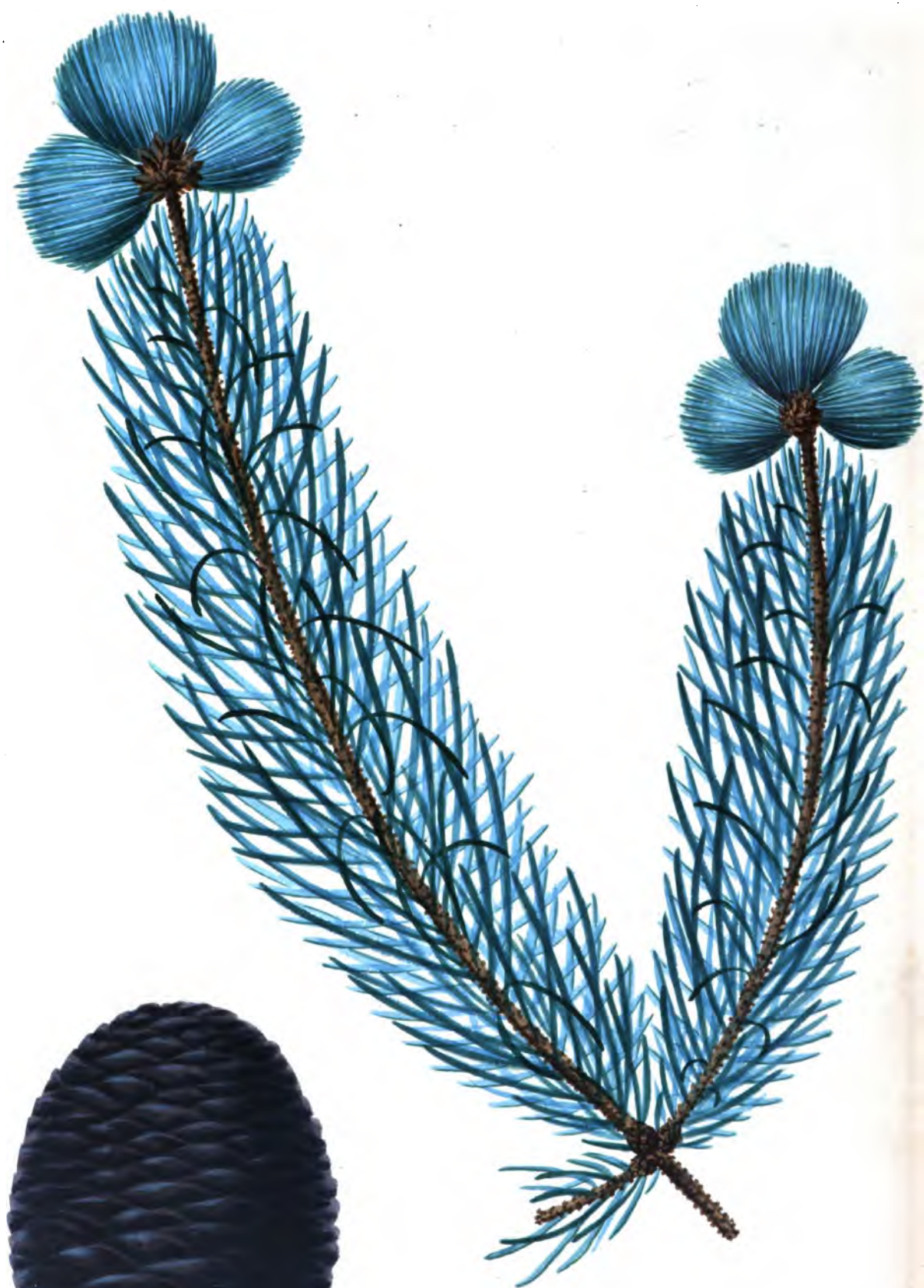
PINUS RELIGIOSA belongs to the group of Silver Firs, and is easily recognised by its pointed leaves, and by the shortness of its cones, which in form and structure bear a marked resemblance to those of the Cedar of Lebanon, although considerably smaller, and of a dark brown colour, almost approaching to black, which most probably, in the fresh state, was of a deep purple. It forms a tall and elegant tree of considerable dimensions. We hope to see it shortly introduced to this country, as it would prove a valuable acquisition, both as an ornamental and useful tree, its elevated locality leaving no doubt of its being capable of enduring our winters. M. Kunth compares it to *Pinus Picea* and *Balsamea*, but the leaves have more the appearance of the yew, unless that the younger ones are silvery underneath, which adds much to the beauty of the tree. The same distinguished botanist informs us that it is used to ornament churches, and hence the trivial name which he has applied to it.

Our specimens were communicated by Messrs. Schiede and Deppe.

EXPLANATION OF TAB. 43.

a. Cone.

b. Scale.



Pinus strobus

Chief Justice Dyer

Examiner of V. C.



3 2044 102 808 888

